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Devoted to the improvement of the Practice,

AND

SUPPORT OF THE INTERESTS OF AGRICULTURE.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

And he gave it for his opinion, "that whoever could make two ears of corn, or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together." *Swift.*

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

DEFENCE OF THE FOUR-SHIFT ROTATION, IN ANSWER TO W. B. H.

To the Editor of the Farmers' Register.

Westover, March 10th, 1835.

It has been my intention for some time past, to answer the objections to the four-field and fallow system, set forth in a communication under the signature of W. B. H., in your January No.; but have been prevented from doing so, at an earlier period, from obstacles not altogether within my control. I am prompted to such a course, not for the mere sake of writing, (for there is nothing that I abominate more) but in vindication of practical opinions, advanced by myself in a former essay—viz. the recommendation and justification of the four-field and fallow system. I will not feign ignorance of the author of the communication alluded to; no, I feel a pride in acknowledging that it has sprung from so high a source: for it could not have originated from one that I more highly respect and esteem, and whose opinions would command more consideration—and an admonition of my *imprudence*, in recommending any particular system, comes with mighty force from that respected writer. But he must pardon me for entertaining such confidence in my agricultural opinions, as have resulted from experience; and which have been countenanced and approved by better heads than mine. The objections and arguments of my friend seem plausible enough, and if not properly considered, tested, and refuted, must consign to oblivion all that I have before said in vindication of the system I have recommended to the public. My object in the present essay, therefore, is to refute, as far as it is in my power, the objections which have been urged, and to place the system, if I can, upon stronger grounds, by yet stronger testimony in its favor.

But before entering upon the main subject of this essay, let me express my entire concurrence with W. B. H. in the opinions he has expressed, with regard to the four-field system of *Arator*. Yes, and let me go a step farther, and say, that if the theory and practice of that great agriculturist and public benefactor had been persisted in, and not received the frowns of prejudiced men, Virginia would long ago have been aroused and resuscitated from her impoverished condition, and would now be ready to adopt the more rigid and profitable system of three successive grain crops in four years. There is a tendency in human nature to mar and throw a shade over the enterprising and laudable intentions of some. Perhaps this is a frailty inherent in us. But at the same time that I agree with him in justifying the system of Arator, I must express my astonishment at his concurrence with that highly intelligent gentleman, Mr. John Wickham, in condemning the adoption, more generally, of the four-field and fallow system. Yes, a system which I understand one or both have adopted, and are now practising. It does not appear either generous or consistent, for a farmer to denounce to others, a system which he pursues with perseverance and profit. Can it be that my learned friend designedly acts against his own precepts? *Video meliora probaque, deteriora sequor.* It may be said that this system has been tried, and that it will not do. Let me tell W. B. H. that he has plucked it in its bud, before it has unfurled itself for him to reap its full benefit. It is condemned before it has had a fair trial, or one round of crops. I would ask, has it not paid him well? Has it not cleared his land of all pests, and improved its fertility? And is not his farm in a better state to afford him both pleasure and profit than before he commenced it? I must be vastly mistaken if it is not; and can assure him, that it will carry with it both profit and improvement as its rotation rolls around.

As I am furnished with no written data, by those who pursue the three-field course, (which seems to me to be rather unkind,) I shall be governed in the comparisons I may make, by my own observations, and what information I have been able to collect from many highly respectable and intelligent gentlemen who have pursued it; and therefore shall be regulated by their practices and results, both on large and small estates.

The first objection of W. B. H. which he deems "insuperable, is its expensiveness, which expense, consists in keeping a supernumerary number of horses, which are only employed at one season of the year, (and that the fallowing season) and kept at a heavy expense the rest." I will ask the gentleman what number of horses would be necessary for the judicious cultivation of a farm of 400 acres under the three-field course? I use twelve mules. With this team I fallowed with ease this fall 100 acres, in five weeks; and during the greater portion of this time the season was excessively dry. Now, *vice versa*, let me ask what this team would have been employed about if they had not been fallowing? Why, I should say idle; and consequently supported at a "heavy expense." For, after the wheat is thrashed, and the corn laid by, which is always accomplished by the middle of August, the teams would have nothing to do until seeding time, were they not employed in this. I should therefore think the labor much more equally distributed under the four than the three-field course. I have never yet seen the day that my teams had not as much as they could do; and sincerely think the fallow season for wheat is the most leisure one we have. The ploughs are kept running at their leisure, having nothing to interrupt them, while the manual labor is employed in gathering and securing the fodder, &c. The fallow field is always ready, and frequently (by the time the corn would admit of being removed,) we have ploughed much of our corn land before the season had arrived for seeding. Many persons have been deterred from fallowing, in consequence of the droughts. I have never yet been compelled to stop a day from that cause, and know I have as stiff land to encounter as any one. It may be attributed in a great measure, to the peculiar advantages of our system, viz: the non-grazing, and the constant stirring of our soil. The land is so frequently turned over, and that deeply, that it never becomes so very hard and tenacious as to cause a suspension in our operations. It is also mellowed and kept porous by the shade and roots of the clover, and the great quantity of other vegetable matter which is given to it. It is worthy of consideration, too, that three-fourths of the entire farm receives the ameliorating effects of the frost. It is true, that I have found it advisable for the relief of the teams to double them, or add one or two more to a plough; and have ploughed with as many as five; but this has rarely occurred—only once in eleven years. It is a great fault with Virginia farmers generally, that they keep too little team. Their work is frequently badly executed, and it results from this false economy. If I were to pursue the three-field rotation, (and which I certainly never shall) I should unquestionably keep and consider this number of horses (or rather mules) necessary. It will be recollected that I work but few oxen—so few as scarcely to be taken into consideration. Having more corn land to put in wheat, and more in corn, I should consider it not more than sufficient at those particular seasons; for it is the corn land with me that is so difficult to seed. The land is most always grassy, and of a wet season it is frequently almost impossible to plough on account of this impediment. This fall I seeded 100 acres of fallow in seven days, and was nearly four weeks seeding 68 acres of corn land. After the fallow is finished, by the last of September, it rarely requires more than harrowing in. The corn land has to have the corn removed, and to be ploughed, harrowed, sowed, and then harrowed again, at the most pressing season; for at this crisis, there must be no time lost, or the season has passed. Your corn land for wheat should be better drained, being more liable to suffer from water, not having the vegetable matter in it which the clover fallow has. It has to lie out longer, and if not drained with care, your clover may be killed from wet in a hard winter. You know, that in a farm of 400 acres, there is only 33⅓ acres of land in cultivation under the three-field course more than you would cultivate under the four-field course, and this is in the fallow for wheat, and which I have before said is done when the teams would have nothing else to do were they not so employed. There will be too, an additional 33⅓ acres in corn under the three-field course, and about which you are engaged in some way, the whole year. Now, I believe it is universally admitted, that all land intended for corn (perhaps it would be better to say all stiff soils) should be turned up as early in the winter as possible, for reasons which it would be superfluous here to mention. How rarely do we see it done. And why? Because we have not had time, having so much of it to do. I should say, as our winters are so variable and uncertain, that this would be a season of unusual pressure: more, or as much so as the seeding season—for when the weather opens, every exertion has to be made to get through in due time. We are enabled the better to get through it in the proper time, because we have less of it to do. I should remark, that as the wheat crop will be much less, and consequently under the three-field course will take a shorter time to thrash and deliver, the teams would be kept at this heavy expense the longer. The time for seeding wheat being short and limited, that system should be pursued by which we can get in the most in this given time, and at the least expense. I would ask why it is that those who pursue the three-field rotation do not finish seeding before those who fallow? Not in consequence of the excess of team; assuredly not: but because we have had six or eight weeks to prepare one-half of our whole surface, while on the other hand you are doing nothing towards it. It is put in, in a few days, before you are scarcely ready to commence, or at least the fallow land can be sowed, while you are seeding the excess of corn land. There is only one-ninth more land in cultivation annually under the four than the three-field course, and this ninth is the fallow, which as I have repeated before, is done when we should be unemployed with our teams, and we should have two-ninths more in wheat. Now let me inquire, which would be the greater press of the two, to prepare and seed two-ninths in ten or twelve weeks, or to prepare and seed one-ninth in four weeks. Again, by way of farther illustration, suppose we had but one team, say two or three horses; which would be the most easily accomplished, to prepare and seed with the same team and hands two-ninths in ten or twelve weeks, (which time you would have, say until the last of October,) or to seed one-ninth in four weeks, having the corn to remove? You could not commence ploughing for the latter, before the former would be already prepared, and would require but harrowing in, which may be done in a few days. In the other case, if the month of October should be a very wet one, you would have but little or no wheat seeded. One may be accomplished, and the other might be impossible. This may be thought an extreme case, but it matters not, as it goes to show the principle, and in the same ratio with the entire crop, will the fallow be sown. Finally, if I were to choose between putting 133⅓ acres of land in wheat and cultivating 133⅓ in corn, and putting 200 acres in wheat, one-half fallow, and cultivating 100 acres in corn, with the same team and hands, I should unhesitatingly choose the latter, independent of its greater reward, as I shall presently show.

As W. B. H. is such an advocate for a substitution of horse-power for manual labor in some other respects, I am surprised he should be so unfriendly to the fallow system, which is accomplished almost entirely by their agency. A farm can be improved and profitably managed, with a good team and few hands, but it cannot be with a good force of hands, and an indifferent team. The expense of the one will be small compared with the other, taking into consideration the first cost, &c. I shall ever bear in mind the opinion once expressed to me upon this subject, of a good practical and strictly economical farmer, who had accumulated quite a large fortune by tilling a poor soil, the late Major James Dillard of Sussex county. He wondered that farmers generally, and particularly on the wheat estates on James River, did not keep more team than they did. He was once of the impression, that more than enough merely to till the soil, and that very imperfectly, were eating up their owners; but by experience had found out his error, and then thought a double team economy. He had substituted mules for oxen almost entirely. He believed oxen kept to perform much hard work, would cost as much as mules—being obliged to be fed with grain, &c., and then not capable of performing one-third the labor. His mode of supporting this extra team, was in the following way. During the winter they were penned in the usual way that we do our stock, except having a more complete shelter to protect them from the weather. These pens were kept well littered with corn stalks, &c. which he considered as good food as they required—and he gave them rarely any grain. After the grass put out they were of no more trouble or expense, except when used. At particular seasons when the services of the whole were required, you could have your work done speedily and effectually. I concur in the opinion of this worthy gentleman, and do believe if we were to keep a double team of mules, and abandon almost the use of oxen, (for from the peculiarities of our situation and climate, particularly in the tide-water section of Virginia, they are comparatively of but little value) we should find it greatly to our advantage. What few I have, eat more grain during winter, than my mules, and cannot do one-third the work—mules are hardier and more long lived animals, and fed in this way, would make more manure, and that better.

The next objection which W. B. H. says is of a formidable character, is that "the more valuable crop, corn, is sacrificed in part, to the crop of wheat, which is less safe."

As I have before said, gentlemen who have raised objections to this system, have furnished no written data by which to be governed. I shall therefore allow in my comparisons the most liberal crops that I have ever heard of, any year, under the three-field rotation, and compare them with my own under the four-field; and in this comparison shall be governed, also, in what I believe my own estate would make under the same system, and under the most favorable circumstances. In getting an average price of the crops of both wheat and corn for the last five years, I have been furnished with such as I may quote, by reference to the journal of a friend, who has regularly sold both crops. It will be unnecessary to state the prices each year, but take an average for the last five years—

The average price of wheat for that time has been, per bushel,	\$1 09½ cts.
The average price of corn for that time has been, per barrel,	2 93½

He says in a note, "the above prices are what I have sold at each year; but I ought to remark, that the prices of wheat are rather under the highest prices that wheat has sold for some years, as I did not always get the highest price for wheat; but the prices of corn are a little over the prices generally got in each year; as I have generally got a little over the market price for corn, as my corn is white and very nicely cleaned, and has a very high character in Petersburg."

When upon a former occasion it was stated by me, that one-fourth of a farm under the four-field and fallow system would produce more corn than one-third under the three-field, it was supposing the farm cultivated under the old plan, which I believe is still kept up, of grazing the one-third bare. For if a farm under that course has ever received the generous assistance of a standing pasture, I have certainly never seen or heard of it. Persons who pursue this course, are too tenacious of their soil for tillage, to appropriate it to so wasteful a purpose, as they think. And I am led to such a conclusion, also, from the knowledge and belief, that under the four-field course, the crops would increase from the increase of fertility; and under the other, would diminish for the want of this improvement—and still think one-fourth of a farm, in a series of years, under the four-field system, will produce more corn, than under the old three-field course. I may revert to this again.

I will now undertake to show to the satisfaction, I hope, of all impartial persons, that the corn crop is not so valuable a one as that of wheat. To effect this object, I shall give my average crops for the last five years, (or rather will give four crops) and will omit the crop of wheat of 1833, as I do not believe any one in this section of Virginia would admit that as any thing like an average crop, it having been destroyed by incessant falls of rain for nearly six weeks, and that when the wheat was nearly matured, an event never known with us before. My crop of that year, however, shall be taken into the calculation in its proper place, and allow the difference it would make in comparing the relative value of the two crops for the whole term of five years. I will first take the crops of wheat for the years 1830, 1, 2, and 4, and the crops of corn for four years also. I will remark, that my crop of corn of 1833 was 616 barrels. I was advised to stack the corn on the land while sowing wheat, that I might get through the quicker in seeding; it was the first time I had ever done so, and do believe I lost 100 barrels by the birds and wet weather; the land was scarcely ever in a condition to drive over without destroying much wheat, and on our narrow eleven feet beds, the carts, &c., filled up our water furrows so much, that I was until the spring before I succeeded in housing it. Corn should always be removed from the land intended for wheat, if possible. Our winters are so wet, that there will be much loss from depredations: and it is a crop which easily decays from exposure to the weather too long.

My average crops of wheat for the above mentioned four years have been 3114 bushels, which at the average price as above quoted is,	\$3409 83
My average crops of corn for four years, viz. 1830, 1, 2, and 3, are 435 barrels, which at the average price above quoted is, - - - -	1275 28
Gross amount under four-field course, if the entire crops had been sold,	\$4685 11
Now 133⅓ acres land in wheat under the three-field course, allowing an average of 12 bushels per acre, is 1600 bushels, which at the average price for wheat as above is, -	\$1752 00
133⅓ acres in corn, allowing an average of 5 barrels per acre, is 666 barrels, which at the average price as above is, - - - - - -	1954 71
	\$3706 71
Balance in favor of four-field system,	\$978 40

Cr.—difference in the "heavy item of expense" in seed wheat, - -	62 88
Dr.—difference in seed corn and clover seed, - - - - - -	15 52
	$900 00

Now here is a difference of $900 upon a small farm in favor of the four-field and fallow system, after allowing an average of 12 bushels of wheat per acre, and 5 barrels of corn, for the above years, which I trust will be considered a liberal one. Including my crop of wheat of 1833, which was 2300 bushels, (and which God grant I could take into the calculation as an average crop, for it promised to be at that advanced season, May and June, to be much the best I ever had,) it would make the balance in favor of the four-field $722. I have given the above average of 12 bushels of wheat, per acre, and 5 barrels of corn, as they are the best I have ever heard of any year, under the three-field course, and hope it will elicit from others, a more correct statement of their average for the years above quoted. Under my present impression, I do not think their crops have averaged 10 bushels of wheat, or 4 barrels of corn, where lime has not been used very extensively, if even then. Several good farms on James River *(possessed of the rich mellow soils, and the great natural fertility of mine,)* have not averaged 8 bushels of wheat, or $3\frac{1}{2}$ barrels of corn under the three-field course, as I have been told by their owners. Why is this so? Most assuredly in consequence of a defective system.

Again, let us continue our comparisons: my fallow for wheat has averaged $21\frac{1}{3}$ bushels per acre, and my corn land in wheat within a fraction of 10 bushels, viz. $\frac{931}{1000}$. You are told that corn will produce more money in a series of years, from the same land, than wheat—now let us see:

100 acres of fallow for 4 years has produced 2133 bushels, which at $1 09½ cts. is, - - - - -	$2335 63
100 acres in corn for 4 years, an average of 5 barrels, is 500 barrels at $2 93½ cts. is, - - - - -	1467 50
Amount in favor of fallow for wheat,	$868 13

An average of the two crops from fallow and corn land for wheat, is rather over 15½ bushels per acre, 100 acres at this is 1557 bushels, at average price is, - - - - -	$1704 91
The crop of corn from 100 acres would be, - - - - - -	1467 50
	$237 41

So that an average of the two crops of wheat from the fallow and corn land, will amount to more than the product of 100 acres from corn as a first crop. Again, let us see the difference between fallow first for wheat, and succeeded by corn; and corn the first crop, and succeeded by wheat.

Wheat from fallow field of 100 acres, an average of 2133 bushels at $1 09½ is, - - - - - -	$2335 63
Corn after wheat 435, on an average at $2 93½ is, - - - - -	1276 72
Amount from fallow for wheat, and corn after it, - - - - -	$3612 35
Corn as a first crop, 5 barrels per acre at $2 93½ is, - - - - -	1467 50
Wheat after corn at 12 bushels per acre is, - - - - - -	1314 00
	$2781 50
Balance in favor of fallow for wheat,	$830 85

But before concluding these comparisons, I will state a fact which will be somewhat more at home to W. B. H. The year I purchased this estate, (1829) my best field was put in corn after clover, by my worthy predecessor, (whose capacity to manage any crop, I am sure W. B. H. will acknowledge, and allow me to add my testimony in his behalf.) This field of 100 acres produced, under his directions, 7 or 8 barrels of corn to the acre, (I do not know the precise amount, but will say eight barrels:) now, from the price of corn that year, (1830) this 800 barrels would not have brought $1500. But we will allow the average as I have before done, and the amount that the 800 barrels would have brought, would be $2348. I put the very same land in wheat after clover in the fall of 1831, and the crop was 3000 bushels, which brought me £1000—more than double, if the crops had been sold as they were made; but we will carry out the average prices—

The product of this 100 acres from fallow, 3000 bushels at $1 09½ is,	$3285 00
The product of the same land in corn, 800 barrels at $2 93½ is, - -	2348 00
	$937 00

Here is a difference in favor of the wheat crop of $937, from the very same land, and both after clover. I hope that this statement alone will satisfy my friend that he is mistaken in supposing that the same land will produce more money from corn than from wheat, where an equal surface is devoted to each crop.

I am very sure that any of our James River lands (of course I do not mean our light sandy soils,) that will produce 4 barrels of corn to the acre, will also produce 20 bushels of wheat upon a good clover fallow, if well prepared and seeded. And do believe also, that land which will produce 8 barrels of corn to the acre, will produce from 25 to 30 bushels of wheat, after a good fallow. But to attain this, the earth must be well ploughed during the months of August and September, (nor should you stop your ploughs because the land is a little hard,) well harrowed, and then well sown and drained, and I will warrant the result. The fallow for wheat has paid me so much more than the corn land, that I am almost discouraged from seeding the latter. This fall, being stopped by heavy rains, I determined to seed a portion in oats, (one-fourth.) If it should result favorably, and the clover should succeed as well after it, I shall hereafter leave one-fourth to one-half for that crop, of my corn land, otherwise intended for wheat.

There are other considerations too, which should be borne in mind, in comparing the relative value of these two crops—one is, that the corn crop will not answer as a sale crop for persons living at a distance from navigation—as it will not afford transportation by land to any distance—which no doubt all calculating persons will take into consideration. Another very important consideration is, that the fallow system gives you so much more straw from which to make manure.

I do in my conscience believe, that a farm, say one of 400 acres, (as that is more familiar to me) will pay from $1000 to $1500 more under the four-field and fallow system, clear, than the same farm managed under the three-field course, in a series of years. The least I can say is, that the advantages in favor of the four-field, will be sufficient to defray all the necessary expenses attendant on the cultivation and management of such a farm.

W. B. H. next supposes the corn crop not sufficient to employ the hands advantageously, except in seeding and securing the crop of wheat. In answer to this I must say, that my belief is, that under this system, with a good team, less manual labor is required than under the three-field course, in preparing and seeding a crop of wheat. Having more corn land, which I hope I have before shown, required more of this sort of labor. But in securing the crop, I will acknowledge it will require a greater press; and who can object to this press, when he is so well paid for it? All this extra time we are supposed to be idle, or at least no profitable farm labor, with teams, can be imagined. I hope your correspondent will not contend that my force (which has been given) is more than sufficient to cultivate a farm of its extent, under any system, where improvement is aimed at. I am as much, or more pressed at this season of the year in preparing for corn, and getting out my manure—for he must recollect how much more the system gives in this article for employment. Upon due reflection, one must think upon the whole, the labor much more equally distributed under this than the three-field course. I have certainly never yet seen the day I had not as much to do as I could do. It has on the contrary been a matter of astonishment with me, what employment is given to the hands under the three-field course at certain seasons, (for as far as I have observed, they keep as large, or a larger force of hands)—particularly those who cultivate their corn crop almost entirely with horse-power. Their crops of wheat are light and small in harvesting and thrashing, and nothing like the quantity of land manured, compared with ours. I like to be pressed, if by this pressure I can receive a sufficient compensation for it. A farmer who always has spare, or sufficient time to accomplish any work, is sure to become careless and inattentive about it; and from this inattention, his purse and farm both become sufferers. I beg not to be understood as desiring this press, that I may impose an undue degree of hardship on the slaves; by no means—but enough to keep one always on the alert, and his wits exerted, to get through in due season.

I must beg leave to differ from W. B. H. in supposing that no corn will be sold from the four-field and fallow system. An estate well managed under that system, should sell corn enough nearly, or quite, to defray the expenses of the estate: for I have no question, but that from its improvement, it will yield from 5 to 8 barrels of corn to the acre. I am supported in this conclusion also, by the fact that my brother the last year averaged 7 barrels of corn per acre, on one-fourth of the Woods Farm in Curle's Neck, an estate which has been regularly under this system for 19 years. I have never made less than enough to support the estates, except the first year; (and this deficiency I have upon a former occasion accounted for) and might have sold corn each succeeding year, had I not had so large and expensive family. And with me it is a most extravagant and wasteful article. If I had practised the same economy in the management of my corn crop that some do, I might have been quite a considerable seller in that article. Many sell more than they should, for their teams are often not in a condition to perform their required labor. As my estate has improved greatly, I shall calculate hereafter on selling enough to pay all the necessary expenses of the estate. I should remark that my corn crop of the last year has not all been shucked out, being told that it would keep much better in this state. I therefore do not know the precise quantity, but this I will say, that, after encountering the severest drought I have ever known, it will make considerably more than the same field did when previously in corn. Dr. John Minge was an eye witness to the fact.

I greatly prefer, too, when we realize money from a farm, it should be received in as large sums as possible, to its being much divided. For my fingers, unfortunately, are too slippery for it to stick, when it comes in driblets, but, when derived in a large sum it is more apt to be appropriated to a good purpose: particularly, would I prefer it, when we can get so much more of it from the wheat crop under the four-field and fallow system.

I should mention also that I have sold corn at $1 50 and $1 75 per barrel. I would ask, how would a poor farmer feel, and in what situation would he be placed, who relied upon his corn crop, as his staple crop, for a support, those years? Of the two crops, wheat and corn, the latter is unquestionably the most uncertain and variable, both in product and price.

W. B. H. next objects to the system, because he says the succession of three white, or grain crops, is opposed to the universal practice and experience of all good cultivators of the soil, both to the north, and in Great Britain. To this I must say, that I have never had the time, and if I had, have never devoted it to reading English works upon agriculture, and therefore can say nought as to their practices. This I do know however, that our climate and soils must differ materially from theirs; and therefore the same rotation of crops may not agree. And I well know that two small grain crops, that is, wheat after wheat, or oats after oats, will not succeed well; because I suppose, the previous one has exhausted most of the ingredients contained in the earth, peculiarly suited to the second crop, and in which it would most delight. But it must be recollected that one-third to one-half of the surface will have had a manuring, besides the remaining effects of the clover, and the entire decomposition of the stubble of the first crop of wheat; and the corn crop, a hoe and summer crop, and entirely a different one in its cultivation intervening, prepares the earth with a pabulum the better suited to the second crop of wheat. It is true that the second crop of wheat is not so large a one as the first—and it would be expecting too much for it to be so, after two other crops previously—but even then, I believe it is a better one than is generally made under the old system of three-fields; and if the average is taken of the two crops it is indisputably so.

W. B. H. next says, "cannot a standing pasture be combined with the three-field course," &c. &c. I have before said that such an occurrence had never yet met my observation. Those who are impressed with the necessity of it are too reluctant to commence it, by surrendering a portion of their arable surface, (which, however, is not always necessary.) And many with whom I have conversed, are impressed with the necessity of a change of system, but cannot bring their minds to the conclusion of surrendering a larger, for a smaller portion of land for corn: for say they, "one-third of my farm, now scarcely furnishes me with corn—how then can I possibly make bread on only a fourth?" "But," it might be answered, "are you not now on the eve of starvation under your present system? Are your lands improving; or do you realize any thing from them?" "No, I sell enough corn barely to pay my blacksmith's account, &c. and of wheat, if it should be a good season, to defray my other expenses, with great economy." "But how are your children to be benefited by this? How are you enabled even to give them a liberal education, independent of furnishing them with a start in the world?—Your parents left but yourself, and you are barely enabled to live with your means, what must become of your six children?" "Why, my father and my grandfather, &c. pursued this same system, and made money with which to buy this same estate, and raised a large family." "But your ancestors lived in better times: lands were then cheap; and they had these same lands that you are now almost starving upon in their primitive state—the rich virgin soil to work upon, and from which to make money; but they have left none of its richness for you, from which to do the same? It is now a waste, gullied and barren. And what has brought it to this condition? Has it not been this same *three-field course* that you now adhere to? Has it ever been under any other? "No." "Well, by adhering to it, can your lands be improved, or your condition bettered?" "No—but before I can diminish my cultivation for corn, (which now barely supports me) I must remove to the west." Yes, sir, this is a true state of things. And this very three-field course has been the principal cause of the great tide of emigration to the west, and until that is abandoned, it must continue to flow.

W. B. H. says again—"is it not better to manure one-third with clover, under the three-field course, than one-fourth under the four-field?" Without this standing pasture I must say, there will be but little benefit derived from the clover under the three-field course. But even admitting it was not grazed off, as is customary, I question very much whether the benefits are not greater towards improvement, when turned under in the months of August and September, when it is in its greatest degree of perfection, than when ploughed under in the winter or spring, when there is scarcely a vestige of it to be seen on the land. A good clover lay for wheat may, much of it, be seen the next winter, when the same land is turned up for corn, in a perfectly decomposed state. And this fact goes a great way too in supporting the belief that one-fourth will make more corn than one-third. I have frequently when the clover has been a very heavy crop, taken up handfuls at a time remaining in this rotted state. Under the foregoing impressions, I doubt very much whether an estate would not improve the faster, when under any system the clover remained but one year. But there remains not a doubt on my mind, when, in addition to the clover, is added the greater quantity of manure.

I would remind W. B. H. and Mr. John Wickham, that it is not always the richer soil that is most successful in clover. On the contrary, we frequently see rich portions of a field fail, and poor hill-sides succeed. The soil should be freshened or altered in some way, either by manures, or by cultivation. Land which has been heavily dosed with clover, will most generally fail, if seeded in it again, before it has gone through some preparatory crop, and will become what is termed clover sick. Poor fresh land, we frequently see succeed better, and bring better clover than much richer land that has before borne it. I think our four-field system peculiarly adapted to the clover husbandry. The land from the previous cultivation, seems to be in the very best state to receive it again. I am confirmed in this fact by never having failed in my life, and if W. B. H. will observe, farms which are under this system, seem always to have better clover fields.

I hope, sir, I have said enough to condemn the three-field system as a rotation suited to us. I will briefly refer to W. B. H's. favorite system of five-fields. There appears to me to be a want of consistency in his preference for it, that I cannot exactly understand. Perhaps it is for my want of a better knowledge of it; and if wrong, I hope to be corrected. My idea of it is this: that one-fifth is in corn, two-fifths in wheat, one-fifth in pasturage, and the remaining one-fifth in clover. To be more particular, and that I may be the better understood, I will convey my idea of it by the following diagram.

	1st field.	2nd field.	3rd field.	4th field.	5th field.
1st year	Corn.	Wheat after clover	Wheat after corn.	Pasture.	Clover.
2nd.	Wheat after corn.	Pasture.	Clover.	Corn.	Wheat after clover
3rd.	Clover.	Corn.	Wheat after clover	Wheat after corn.	Pasture.
4th.	Wheat after clover	Wheat after corn.	Pasture.	Clover.	Corn.
5th.	Pasture.	Clover.	Corn.	Wheat after clover	Wheat after corn.

I have been thus particular that I may be put right, if I have taken a wrong view of the rotation. Now, W. B. H. objects to the four-field rotation, because only one-fourth is apportioned for his favorite and more valuable crop, corn. How he can reconcile this system to himself, when one-fifth only comes in that crop, (and that not after clover) I cannot imagine: for the consequence must be that his more profitable crop, corn, will be greatly lessened in quantity. Again he objects to the four-field system, because, says he, "is it not better to improve in this way one-third than one-fourth of the same farm" with clover? Under this five-field course there will only be one-fifth improved with clover. And I would ask if it is not better to improve with clover one-fourth than one-fifth? No one can doubt but that the field allotted to be grazed will be cropped harder than any. My impression is that it will be the greatest sufferer of the five fields. The idea of appropriating one-fifth annually of arable surface as a pasture, will never do. The clover if sown on the pasture field will soon be destroyed by the stock, for you must commence on it, grazing before it can have gotten much start in the spring in growing; and it is easily destroyed at that season, and if not seeded in clover lands which are regularly cultivated, throw up but little grass from which to nourish stock. The advantage of a standing pasture is, that it forms a sod of blue or other grasses, which is not killed, but increased by being trod by stock; but where you cultivate lands regularly, this sod is destroyed, and therefore your fields will be left bare and exposed the whole summer to the hoof and the sun. But there are other objections which are of too "formidable" a character to be overlooked, and which I should imagine would be serious ones with him, viz. that the field grazed would come in corn the succeeding year, and consequently that crop greatly shortened for the want of the clover. There would not only be three grain crops in succession, but what would be much worse, there would be four, or what might be considered equivalent to it—and they may be counted in this way. 1st. Wheat. 2nd. Grazing—3rd. Corn—and 4th. Wheat. So that the two latter crops will not have received any benefits from the clover whatever: on the contrary will be preceded by a bare crop, (for I know not what else to call it.) This must be the case; for the usual number of stock of all kinds kept on an estate, will leave not a vestige of vegetable matter on one-fifth of a farm, when it is kept under regular tillage, and only remains out one year. It is true you will have the stick weed, &c., which we had better be without. Again; under this system you would have less materials from which to make manure. Also, you will have more fencing to keep up; as your wheat fields must be divided from each other occasionally. The fact stated by W. B. H of his having to abandon it in consequence of its becoming too foul, is alone sufficient to condemn it with me. I am opposed to these odd rotations—for to me they appear odd, indeed. If I were to cultivate lands which would not bear the four-field and fallow system, (and I think there is but little with us that will not) I should adopt the system of Arator—and which is the system I spoke of in allusion to Mr. Lewis. Or, I should adopt the six-field until my land was in a condition to pursue the more rigid and profitable one of four-field, and fallow: but none without a standing pasture. If our lands lie out too long (which is an objection to all fallow systems with us, except the four-field,) they become too foul with blue grass, &c. &c. Once in four years in a hoe crop is almost indispensable, and therefore the five or six-field systems will not answer. If W. B. H. imagines that I recommended the four-field and fallow system for "universal adoption," he is certainly mistaken. I did so for our James River lands, and now take pleasure not only in recommending it to James River farmers, but for all farms which can be made to produce clover—as it combines the two desiderata of profit and improvement in an eminent degree, above all others.

In my allusion to the four-field and fallow system having originated with Mr. James M. Selden in Curle's Neck, on James River, I was not aware of its having been practised by any one but himself, prior to the time referred to, but have since learnt, from a conversation with him, that Mr. Harding practised it about the same time, which he was not then aware of at the time he commenced it. Nor had he ever heard of its being practised by any one else, until Major Heth brought Mr. Harding down to Curle's with him, for the purpose of obtaining his advice with regard to its management, being then thought one of the best farmers in the state. It was at this time Mr. J. M. Selden first learnt that Mr. Harding was pursuing the same system with himself. And Mr. H. advised it as the best system for Major H. at Curle's. He (Mr. Harding) told Mr. J. M. S. that he was practising it on an estate which he had purchased, and which was in a very impoverished condition, but under this system, expected in a short time to resuscitate it. I believe there is not a question about his having done so; whether he continued it to his last, or not, I cannot say—but ever since I can recollect, or took any interest in agriculture, Mr. Harding has been held up as a model, and as being the very best farmer in the state. Believe me, sir, when I say that I did not intend to deprive Mr. Harding of one iota of his reputation as the father of this system. No, none—on the contrary let me add to it, by calling it *Harding's system;* and hope it will be handed down to posterity as immortalizing his name.

But before dismissing this subject, let me say a word in support and justification of this system, as practised by Mr. Harding at Dover. Mr. Harding did not pursue the system there, with the intention of improvement, having had it on lease; and I will state a few facts, as I am credibly informed, which should go to prove it. He had no standing pasture; used none, or but little plaster; sowed clover not with the view of improvement, but for grazing—had a smaller force than was necessary for the cultivation of the estate—kept a large head of cattle, and from them derived a great portion of his profits. For I am told he kept fifty or sixty milch cows, and from butter alone sold from $1000 to $1500 annually. Now, is it expected, or could it be expected, that an estate would improve under these circumstances? I wonder W. B. H. should not have inquired more particularly into the mode of its cultivation, and the assistance given to it, before pronouncing condemnation upon the system. I have never yet seen an estate under this system that has not improved, where it has been fully carried out; and all certainly cannot be in the hands of first rate managers. But I will state a fact, and W. B. H. can easily get the same information from fountain head—that Col. Allen's estate in Curle's Neck, under the management of my brother Miles, has the last year cleared net proceeds between seven and eight per cent. upon $100,000—which is more than the first cost, and rather more than its appraisement, within the last few years—and this seven or eight thousand dollars net, has been done with forty mules, and fifty hands of all sorts, and no oxen, or scarcely any—for I think he has but eight on the whole estate. This is from an estate that has been under this, and much harder systems for the last eighteen or twenty years, but for the last six or seven years under the four-field and fallow regularly. It would be well to mention too, that from its particular situation, it is a very expensive estate, as all the pork, &c. for its use has to be purchased, which should never be done on any, if possible. The gross amount of sales from wheat and corn, were between twelve and thirteen thousand dollars. Let me inform W. B. H. too, that this estate has regularly sold from $1000 to $3000 worth of corn a year. These facts do not show that this is an "exhausting course;" but on the contrary, a very improving one. These results too are without one cent being expended in lime or marl. I could relate other instances of its great benefits, but it would be superfluous. I am already weary of reciting them, and am sure others must be of hearing them. I shall therefore take my farewell of the subject, and let my efforts, as I hope in a good cause, go for what they are worth.

JOHN A. SELDEN.

From the Rail Road Journal.

EXTRAORDINARY PERFORMANCE.

The purse of $1000 offered by Mr. J. C. Stevens to any one who should succeed in going ten miles, on foot, within the hour, was yesterday gained, *eleven seconds* within the time, over the Union Course, Long Island, by a Connecticut man, named Henry Stannard, a farmer of Kilingworth. Two others, as we learn from the Courier, went the ten miles, one a Prussian, named George W. Glauer, who did the distance in 60½ minutes—and the other an Irishman named Mahoney, who did it in 61¾ minutes.

There were at starting nine competitors, whose names and deeds are thus set forth in the Courier:

Miles.

	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th
Stannard,	3	4	3	3	3	2	2	1	1	1
Glauer,	2	2	1	1	2	3	3	3	2	2
Mahoney,	1	1	5	5	4	4	4	4	2	2
Downes,	5	3	2	2	1	1	1	2	gave in.	
McGargy,	6	7	7	7	5 gave in.					
Wall,	4	5	4	4 gave in.						
Sutton,	8	8	6	6 gave in.						
Mallaro,	9	9	8	8 fell and gave in.						
Vermillye,	7	6 gave in.								

The winner did not show much fatigue, and was seen soon after riding about the Course.

The other two who went the ten miles received $200 each.

The Courier gives this statement of the time in which each mile was done by the winner:

	Min.	Sec.
1st mile,	5	36
2d "	5	45
3d "	5	58
4th "	6	29
5th "	6	2
6th "	6	3
7th "	6	1
8th "	6	3
9th "	5	57
10th "	5	54
	59	48

It is said that the course is six feet over a mile, making sixty feet more than the ten miles, in the distance run.

Now 60 feet being the 88th part of a mile, it would allow (taking the time of the last mile) four seconds, which is to be deducted, making the distance therefore in fifty-nine minutes and forty-four seconds.

The speed of the runners will be best estimated perhaps by stating, that Stannard was accompanied the whole distance by Mr. Stevens on horseback, and that the horse was all the time in a fast canter.

From the Genesee Farmer.

BEET ROOT SUGAR.

A committee of the French Chambers have made recently a long and elaborate report, on the state of their tariff, and the effect of high duties, in the course of which, the article of imported sugars necessarily led to an examination of the quantity of that staple manufactured in France.

The report "enters at great length into the state of the manufacture of beet root sugar, and brings to light a variety of circumstances respecting that description of sugar hitherto but little known even in France. It appears that this sugar, not being liable to duties in any way proportioned with those levied on the colonial article, has established a competition in the home market which is highly injurious to the importer of and the dealer in the latter. The number of manufactories of beet root sugar in various parts of France has been increasing rapidly of late years. Land destined for the cultivation of beet root is let at a higher rent than for any other production. About 18,000,000 kilogrammes, equal to 36,000,000 lbs. or 18,000 tons a year of the article are manufactured, according to the latest estimates, and the profits it yields to the manufacturer are enormous. The committee recommend that beet root sugar should be taxed in such a way as to be of advantage to the revenue, without being injurious to the interests of the colonial planter and the refiner of colonial sugar."

From Radcliff's Report on the Agriculture of Flanders.

FEEDING HORSES IN FLANDERS.

Eight horses perform the entire work of the 200 acres, and are in the highest possible condition. They are of the most compact kind of Flemish horse, and do not exceed 15½ hands, in height; chiefly roan and chestnut in color. As the banks of the river supply good hay, in this district they are indulged with that species of food, which is not the case in other parts of Flanders; but they are also fed upon straw, chiefly of rye, and upon oats with chopped straw in every feed, and *after* every feed, a bucket of water, richly whitened with rye, or oat meal. A vessel of this composition is in every stable, nor are the horses suffered to have any other drink. The quantum of food in the 24 hours for each horse, in the winter, is 15 lbs. of hay, 10 lbs. sweet straw, and 8 lbs. of oats; in summer, clover is substituted for hay; the other feeding remains the same; and the white water is never omitted: on this they place a chief reliance. The allowance of oats is but moderate, and yet the horses are in superior condition; the chopped straw contributes much to this, in converting, by the mastication necessary, every grain of corn to nutriment. The use of it is so universally approved throughout Flanders, that in every town it is sold by retail, and if generally adopted with us, it could not fail to improve the condition of the working horses, and lessen the expense of their provender.

In Flanders, a farmer will work fifty acres with two horses; and by the regularity of his care and keep, will preserve their condition. In Ireland, the great wheat farmer of Fingal, upon a similar extent, will keep four times the number, fed more expensively, but not so judiciously, always overworked and always poor. Some of these farmers, upon 100 acres, keep sixteen horses in their employ, and there have been instances of three-fourths of that number being lost within the year by hardship and disease. By these means the profits of a farm are consumed without benefit to the farmer; and what would reasonably support and enrich him, is squandered upon supernumerary horses. This special circumstance, not the high rent, keeps the tenant in indigence and difficulty. If landlords interferred to procure for their tenantry a good description of working horse, and encouraged them to use him properly, and feed him well, it would tend more to their advantage than any abatements they can give. Upon the farm of Vollandre, the management was in all points to be approved: economy prevailed in every respect, except in the application of manure; the occupier was in comfort and affluence, and yet his rent was near 40s. by the plantation acre, and his taxes triple those of the Irish farmer. The difference is to be found in established system, skilful management, and unceasing industry.

GAS USED AS FUEL FOR COOKING.

Extract from a letter of Mr. John Barlow, one of the most experienced and distinguished engineers of London, dated on the 27th February last.

"There is one source of revenue to a coal gas company, fast coming into practical effect here, which promises to be of great importance, namely cooking by gas; I know one family who have used no other fuel for cooking for the last two years, and another who for several years have never lighted any other fire in their house, for any purpose whatever, than gas, during the 3 or 4 hot months, and they both say that it is cheaper, more convenient, cleanlier and the cooking better. Hundreds, and probably thousands of families will, in this country, be supplied with gas for cooking during the ensuing summer. They now roast, bake and boil by gas. The heat is always ready when wanted, and is extinguished when it is no longer required: no dust, no preparation, nor any cleaning up afterwards; the cook can leave a joint of meat either roasting or boiling, and never look at it again till the clock informs her it is time to take it up; I know a family who regularly put their meat down, and all go to church on Sunday, locking the house up, and leaving a capital dinner to the care of the gas. I dwell on this subject a little, because in my view, it is very important, and it behooves directors and shareholders to give it every encouragement.

LIVERPOOL AND MANCHESTER RAILWAY.

The editors of the Baltimore American have been favored with a report of the directors of this work, and present their readers with a brief synopsis, from which it appears that during the half year ending on the 31st December, the receipts were,

Coaching department,	£60,292	7	4
Merchandize do.	41,197	18	6
Coal do.	3,408	16	4
	104,899	2	2
The expenses of all kinds, during the same period, were	64,552	15	7
Net profit for six months,	£40,346	6	7

The directors in former reports have alluded to the course which they had considered it expedient to adopt of substituting heavier and stronger rails in place of those which from time to time had been bent or broken; owing to the service to which they were subjected, from the speed and weight of the engines, being far more severe than was originally contemplated. From experience of the decided superiority of these parts of the way which have already been laid with the stronger rails, the directors feel the propriety of proceeding to re-lay with stronger rails such portions of the line as have from time to time to be taken up for the purposes of substituting stone blocks for the original wooden sleepers, and they doubt not, in so doing, they shall obtain the concurrence of the proprietors.

By the foregoing statement of accounts it appears that there is a net disposable profit for the half year of	£40,346	6	7
Which added to the surplus from last half year	155	11	0
Amounts to	£40,501	17	7

Of this sum the directors recommend that a dividend be now made to the proprietors of £4 10s. 0d. per £100 share amounting to £35,850. That £3000 be appropriated to the relaying of the way with stronger rails and that the remaining sum of £1651 17s. 7d. be carried as general balance to the next half year's account.

Extracts from the last edition of the "Complete Grazier."

ON THE ECONOMY AND MANAGEMENT OF THE DAIRY.

Of the making and preservation of Cheese.

The goodness of cheese, as well as of butter, depends much on the quality of the milk; though the season, and particular process adopted in making it, also, have a very considerable influence upon it in this respect—more perhaps than the material of which it is prepared. We shall, therefore, briefly notice these circumstances; and, as different modes of making cheese are practised in different counties or places, we shall then concisely state those which are more particularly deserving of notice.

The best *season* for this purpose is from the commencement of May till the close of September; or, under favorable circumstances, till the middle of October; during which interval cows are, or can in general, be pastured. In many large dairies, indeed, cheese is often manufactured all the year round; but the winter cheeses are much inferior in quality to those made during the summer months; though there is no doubt but that good cheese may be made throughout the year, provided the cows be well fed in the winter. It is also worthy of attention, that milk abounds most in caseous matter during the spring, and with the butyraceous in summer and autumn.

After milk has been exposed for a certain time to the air—generally two or three days, according to the season—it becomes sour and coagulates. The curd which is thus formed may then be either made into butter, by the process of churning, as already detailed in the preceding chapter, or, being merely broken, the serum, or whey, separates from it, and, by means of pressure, it becomes cheese. The curd thus formed, being composed of both the caseous and the butyraceous matter combined, constitutes the richest, or what is commonly termed *full-milk cheese:* that produced by the curd which remains after the cream has been taken off, is necessarily more poor, in consequence of the abstraction of the butyraceous substance, and is termed *skim-milk cheese;* but there is no material difference in the mode of making either. It having, however, been found, that cheese made from sour milk is hard and ill-flavored, means have been devised to curdle it while sweet. With this view various substances have been employed, but the most effectual hitherto discovered, and consequently the most generally used, is taken from the stomach of calves—denominated *rennet;* and, as no good cheese can be made without it, great attention is necessary in preparing it for coagulating the milk. Strictly speaking, rennet is the coagulated lacteous matter, or substance, found in the stomachs or maws of calves that have been fed only with milk, though it is, in a more extensive sense, applied to the *bait, vell, maw,* or, *stomach,* as it is variously termed, which possesses the same properties; and which is now invariably used for that purpose.

Dairy women usually preserve the maw, and the curd contained in it, after salting them, and then, by steeping this bag and curd, make a rennet, to turn their milk for making cheese. But a more simple method, and which is equally good in every respect, is to throw away the curd, and, after steeping it in pickle, stretch out the maw upon a slender bow inserted into it, which will soon be very dry, and keep well for a long time. An inch or two of the maw thus dried, is steeped over night in a few spoonsful of warm water, which water serves full as well as if the curd had been preserved for turning the milk. It is said that one inch will serve for the milk of five cows. However, as the quality of the rennet is of considerable importance, in the manufacture of cheese, we shall here mention a few of the most approved methods of its preparation. That recommended by the late Mr. Marshall is as follows:—

"Take the maw of a newly killed calf, and clean it of its contents: salt the bag, and put it into an earthen jar for three or four days, till it form a pickle; then take it from the jar, and hang it up to dry, after which it is to be replaced in the jar, (the covering of which should be pierced with a few small holes to admit air,) and let it remain there for about twelve months.

When wanted for use, a handful each of the leaves of sweet-briar, dog-rose, and bramble, with three or four handfuls of salt, are to be boiled together in a gallon of water, for a quarter of an hour, when the liquid is to be strained off and allowed to cool. The maw is then to be put into that liquid, together with a lemon stuck round with cloves; and the longer it remains in it, the stronger and better will be the rennet. Half a pint or less of the liquor is sufficient to turn 50 gallons of milk."

The above is much used in Gloucestershire. In Scotland, according to Mr. Aiton, so far from throwing away the curdled milk found in the stomach of the calves, or washing away the chyle, both are carefully preserved, and are supposed to form a more powerful rennet than can be drawn from the bag alone. It is prepared thus:—

"When the stomach, or bag—usually termed the yirning—is taken from the calf's body, its contents are examined, and if any straw or other food be found among the curdled milk, such impurity is carefully removed; but all the curdled milk found in the bag is carefully preserved, and no part of the chyle is washed out. A considerable quantity of salt—at least two handfuls—is put into and outside the bag, which is then rolled up, and hung near a fire to dry: it is always allowed to hang till it is well dried, and is understood to be improved by hanging a year, or longer, before being infused.

When rennet is wanted, the yirning, with its contents, is cut small and put into a jar with a handful or two of salt; and a quantity of soft water that has been boiled, and cooled to about 65°, or of new whey taken off the curd is poured upon it. The quantity of water, or whey, to infuse the bag, is more or less according to the quality of the yirning: if it is that of a new-dropped calf, a Scots choppin, or at most three English pints, will be enough; but if the calf has been fed four or five weeks, two quarts or more may be used. The yirning of a calf four weeks old yields more rennet than that of one twice that age. When the infusion has remained in the jar from one to three days, the liquid is drawn off, and strained, after which it is bottled for use; and if a dram-glass of any ardent spirit be put into each glass, the infusion may either be used immediately, or kept as long as may be convenient."

Rennet thus made, from the maw of a well fed calf of about five weeks old, Mr. Aiton says will coagulate thirty gallons of milk; but its chief advantage consists in the quickness with which it is performed, which he asserts does not occupy more than from five to ten minutes, while in England the same operation usually requires from one to sometimes three hours, and this he attributes chiefly to the removal of the curdled milk and the washing away the chyle from the maw, and partly to the practice of hanging up the bag to dry after it has been steeped, by which the pickle, which he considers as the best part of the rennet is lost. In opposition, however, to Mr. Aiton, an ingenious writer, who has made strict inquiry into this subject, recommends the following method of preparing a rennet, which he has found to be better than any other:—

"Throw away the natural curd, which is apt to taint and give the bag a bad smell; then make an artificial curd, or rather butter, of new cream, of sufficient quantity to fill the bag. Add three new-laid eggs well beaten, one nutmeg grated fine, or any other good spice; mix them well together, with three tea-cups full of fine salt; fill the rennet bag with this substance, tie up the mouth, lay it under a strong brine for three days, turning it over daily. Then hang it up in a cool and dry place for six weeks, and it will be fit for use. When it is used, take with a spoon out of the bag a sufficient quantity of this artificial butyrous curd for the cheese you purpose to make, dissolve it in a small quantity of warm water, and then use it in the same manner as other rennet is, mixed with the milk for its coagulation."

But, whatever kind of rennet the dairy woman may choose to prepare, it should be remembered, that this animal acid is extremely apt to become rancid and putrescent, and that great care is necessary to apply a sufficient quantity of salt to preserve it in its best state; because the rank and putrid taste, occasionally found in some of our English cheeses, is owing to a putridity in the rennet. The following mode of preserving it in a sweet state, as practised in the West of England, may, therefore, not be undeserving of attention.

"When the rennet bag is fit for the purpose, let a strong solution of salt be made with two quarts of sweet soft water, and add to this small quantities of almost every indigenous and foreign aromatic spice that can be obtained. Boil the whole gently, till the decoction is reduced to three pints, over a clear fire, if possible, or at all events, so that it may not become smoky; next, let the liquor be carefully strained, and poured, in a tepid state, upon the rennet bag. A lemon may now be sliced into it; and, after the whole has stood at rest for one or two days, it may be strained and bottled. If well corked, it will retain its goodness for a year, or even longer, and will communicate an agreeably aromatic flavor to the cheese that may be made with it."

In a case of emergency, or where no good rennet can be procured, a decoction of the yellow flowers of the *cheese-rennet*, or yellow lady's bed-straw, (*Galium verum*, L. which blossoms in July and August,) will answer every purpose for coagulating milk. Or the marine acid, in the hands of a judicious person, may be employed for this purpose as is practised in Holland. The mode of making cheeses in most general use in this country is chiefly as follows, although there are many slight varieties in the practice of different dairies even in the same counties.

Cheshire cheese. The evening's milk is set apart till the following morning, when the cream is skimmed off, and poured into a brass pan heated with boiling water, in order to warm; one-third part of that milk is thus heated. The new milk, obtained early in the morning, and that of the preceding night, being thus prepared, are poured into a large tub, together with the cream. To this is put a piece of rennet, which had been kept in warm water since the preceding evening, and in which a little Spanish annatto (the weight of a quarter of an ounce is enough for a cheese of sixty pounds) is dissolved.* The whole is now stirred together, and covered up warm for about half an hour, or till it becomes curdled; it is then turned over with a bowl, and broken very small. After standing a little time, the whey is drawn from it, and as soon as the curd becomes a little more solid, it is cut into slices and turned over repeatedly, the better to express the whey. Next the curd is removed from the tub again, broken by hand into small pieces, and put into a cheese-vat, where it is strongly pressed both by hand and with weights, in order to extract the remaining whey. After this it is transferred to another vat, or into the same, if it be previously well scalded, where the same process of breaking and expressing is repeated, till all the whey is squeezed from it. The cheese is now turned into a third vat, previously warmed, with a cloth beneath it, and a tin hoop or binder put round the upper edge of the cheese, and within the sides of the vat, the former being previously enclosed in a clean cloth, and its edges placed within the vat. These various processes occupy about six hours, and eight more are requisite for pressing the cheese, (under a press of 14 or 15 cwt.,) which, during that time, should be twice turned in the vat, around which are passed thin wire skewers, and frequently shifted. These skewers are of strong iron wire, about 18 inches long, and the vat and hoop have holes, about an inch apart, through which the sides of the cheese are skewered. Some dairy women also prick the upper surface of the cheese all over, an inch or two deep, in order to prevent its blistering. The following morning and evening it must be again turned and pressed; and also on the third day, about the middle of which it is removed to the salting chamber, where the outside is well rubbed with salt, and a cloth binder passed round it, which serves as a lining to the vat, but is not turned over the upper surface. The cheese is then placed midside up in brine, in a salting tub, and the upper surface is thickly covered with salt. Here the cheese is for nearly a week turned about twice in the day, then left to dry for two or three days, during which period it is turned once, being well salted at each turning, and cleaned, each day. When taken from the brine, it is put on the salting benches with a wooden girth round it, of nearly the thickness of the cheese, where it stands about eight days, during which time it is again salted and turned every day. It is next washed and dried; and, after remaining on the drying

* Marigolds, boiled in milk, are also used for coloring cheese; to which they also impart a pleasant flavor. In winter, carrots scraped and boiled in milk, afterwards strained, will produce a richer color; but they should be used with moderation, on account of their taste.

benches about seven days, it is again washed in warm water with a brush, and wiped dry. In a couple of hours after it is scoured all over with sweet whey batter; which operation is afterwards frequently repeated; and lastly, it is deposited in the cheese or store room, (which ought to be moderately warm, and sheltered from the access of air, lest the cheese should crack,) and turned every day, till it become sufficiently hard and firm.* They require to be kept a long time; and if not forced by artificial means, will scarcely be sufficiently ripe under two or three years, or even more. The Dutch make their cheese nearly in the same manner, excepting that they substitute the marine acid, or spirit of sea salt, which imparts to *Dutch cheese* the peculiarly sharp and salt flavor for which it has long been remarked; and that they leave out the cream.

In Mr. Holland's very intelligent Survey of Cheshire, the following remarks occur on the practice of the Cheshire dairies, from which some important hints may be gathered respecting both that and the general process of making cheese. He says, "this is generally admitted, that not only the quantity, but the quality of the curd as to texture, (toughness, or otherwise,) depends, in a great measure, on the length of time the cheese is in coming; and that the time again depends on the quantity and strength of the coagulum used, the state of the atmosphere, and the heat of the milk when put together. In this stage of the art, where a degree of accurate certainty seems to be required, there is no other guide but the hand, and the external feelings. The thermometer of a Cheshire dairy woman is constantly at her fingers' ends. Accordingly, the heat of the milk when set is endeavored to be regulated by the supposed warmth of the room and the heat of the external air; having reference also to the quantity and strength of the steep; so as that the milk may be the proper length of time in sufficiently coagulating; which is generally thought to be about an hour and a half. The evening's milk—of suppose 20 cows—having stood all night in the cooler and brass pans, the cheese maker (in summer,) about six o'clock in the morning, carefully skims off the cream from the whole of it, observing first to take off all the froth and bubbles, and the rest of the cream is put into a brass pan. While the dairy woman is thus employed, the servants are milking the cows, having previously lighted a fire under the furnace, which is half full of water. As soon as the night's milk is skimmed, it is all carried into the cheese tub, except about three-fourths of a brass pan full, (three to four gallons,) which is immediately placed in the furnace of hot water, in the pan, and is made scalding hot; then half of the milk thus heated is poured to the cream, which, as before observed, had been already skimmed into another pan. By this means all the cream is liquified and dissolved, so as apparently to form one homogeneous or uniform liquid, and in that state it is poured into the cheese tub. But before this is done, several bowls or vessels full of new milk, or perhaps the whole morning's milk, will generally have been poured into the cheese tub.

"In some celebrated dairies, however, they do not, during the whole summer, heat a drop of the night's milk; only dissolve the cream in a brass pan floated or suspended in a furnace of hot water. In other dairies, they heat one-third, one-half, or even more than that of the previous night's milk; but in all, they are careful to liquify or melt the cream well before it is mixed with the milk in the tub;* and whatever may be the general custom in any given dairy respecting the heating of the milk, the practice varies according to the weather. It is generally on poor clay lands that the milk most requires warming: on good rich soils, it will not bear much heating; at least, by so doing, the process of cheese-making is rendered more difficult.†

In making *Gloucester cheese*, as well as other kinds of thin, or *toasting-cheese*, known as the *Trent-side* and *Cottonham*, the milk is poured into the proper vessel, immediately after it has been drawn from the cow; but being thought too hot in the summer, it is lowered to the due degree of heat by the addition of skimmed milk; or, if that will not do, by pouring in water. When the curd is *come*, it is broken with a double cheese-knife, and also with the hand, to separate it from the whey which is ladled off. The curd is then put into vats, which are submitted to the action of the press for ten minutes or a quarter of an hour, till the remaining whey is extracted. It is next removed into the cheese-tubs, again broken small, and scalded with a pailful of water, lowered with whey in the proportion of three parts of water to one of whey, and the whole is briskly stirred. After standing a few minutes for the curd to settle, the liquor is strained off, and the curd collected into a vat, and when the latter is about half full, a little salt is sprinkled over and worked into the cheese. The vat is now filled up, and the whole mass of cheese turned twice or thrice in it, the edges being pared, and middle rounded up at each turning. Lastly, the cheese is put into a cloth, and, after undergoing another pressure, it is carried to the shelves, where it is turned, in general, once a day, till it become sufficiently close and firm to admit of its being washed. The only material difference is, that Gloucester and Trent-side are rather thicker than the Cottonham—which is not more than an inch and a half in depth, and is therefore sooner

* The cheese rooms in Cheshire are generally placed over the cow houses on a floor strewed with rushes. This is done, in order to afford them, from the heat of the cattle below, that uniform and moderate degree of temperature, which is deemed essential to the proper ripening of cheese.

* The practice in this respect is different in Scotland, in districts of which country the manufacture of cheese, particularly the *Dunlop*, has been carried to great perfection. There the cream, when separated from the milk, is put into the curd-vat cold, and brought, by the admixture of warm milk, to the general warmth of the mass at setting the curd. Mr Aiton is of opinion, that by melting the cream, much of the oily matter it contains is carried off with the whey, and impoverishes the cheese: but he admits that he has not had sufficient experience of that practice to enable him to decide on its comparative merit with the Scotch method.

† This although the opinion of Marshall and other celebrated writers, as well as that of Mr. Holland, is contradicted by Mr. Aiton, who says, "I never understood that the milk of cows so fed, (on poor clays, or even wild waste land, or moss,) required to be heated more than that of cows fed on the warmest valleys or richest haughs in our best cultivated districts."—*Dairy Husbandry*, p. 128.

ready for the table than the others; and that the latter is put together rather hotter than the two former.

Much of what passes under the names of *Double Gloucester*, and of *Cheddar Cheese*, is made in Somersetshire, by the following simple process:—

When the milk is brought home, it is immediately strained into a tub, and the rennet is added, in the proportion of about three table-spoonsful to a quantity sufficient for a cheese of twenty-eight pounds; after which it remains undisturbed for about two hours, when it becomes curd, and is broken. That done, three parts of the whey are warmed, and afterwards put into the tub for about twenty minutes: the whole whey is then again put over the fire, made nearly scalding hot, and returned into the tub, to scald the curd, for about half an hour, after which part of the whey is again taken out, and the remainder left with the curd until it is nearly cold. The whey is then poured off, the curd broken very small, put into the vat and pressed, remains there nearly an hour, and is then taken out, turned, and put under the press again till evening; when it is turned, and put in again until the next morning. It is then taken out of the vat, salted, put into it again with a clean dry cloth round it, and remains in the press till the following evening, when it is again taken out, salted, put into the vat without a cloth, and pressed till the next morning: it then finally leaves the press, and is salted once a day for twelve days.*

Stilton Cheese has only been introduced since about the middle of the last century. It was first made by a Mr. Paulet, who resided in the Melton quarter of Leicestershire, but who, being a relation of the landlord of the Bell Inn, at Stilton, on the great North road, supplied his house with cheese of such a singularly superior quality, that it became in demand beyond the consumption of the house, and was then sold so high as half-a-crown a pound.† It thus acquired the name of Stilton Cheese; but the mode of making it having been soon discovered, it is now generally made throughout all the neighboring counties; the sale is no longer confined to Stilton, and much of what comes to market under that denomination is of very inferior quality. Its richness depends, of course, both on the breed of cows employed, and the quality of the pasture on which they are fed, as well as upon the quantity of *cream* used in the making up; for, unless a large portion of this be added to the milk, the cheese will be deficient in all the essential qualities for which it is remarkable.

It is commonly made by putting the night's cream to the milk of the following morning with the rennet; and as soon as the curd is come, it is taken out *whole* and put into a sieve, gradually to drain. While it is thus draining, it is pressed till it become dry and firm, and is then removed into a wooden box or hoop, adapted to its size; this sort of cheese being so very rich, that it would separate or fall to pieces were not this precaution adopted. Afterwards it is turned every day on dry boards, cloth binders being tied round it, and which are made tighter as occasion may require. After it is removed from the box or hoop, the cheese is closely bound with cloths, which are changed daily, till it become sufficiently compact to support itself; when these cloths are taken away, each cheese is rubbed over every day once (and if the weather be moist or damp, twice,) for two or three months, with a brush, which is also done every day to the tops and bottoms of the cheeses before the cloths are removed. Sometimes it is made in a net like a cabbage-net, which gives it the form of an acorn. Stilton cheeses are not sufficiently mellowed for use, until they are two years old; and will not sell unless they are decayed, blue, and moist. In order to accelerate their maturity, it is no uncommon trick to place them in buckets, and cover these over with horse-dung. Wine is also said to be added to the curd, in order to produce a rapid advance of ripeness.

In making *Wiltshire cheese* (which is admitted to be among the best English sorts) the milk is "run" as it is brought from the cow; or if it be of two warm a temperature, it is lowered by the addition of a little skimmed milk. The curd is, in the first, place, broken with the hand to various degrees of fineness, according to the sort of cheese intended to be made. Thus, for *thin* cheese, it is not reduced so fine as in the county of Gloucester; for the *thick* kind, it is broken still finer; and for *loaves* it is almost crushed to atoms. But, in first breaking the curd, care is taken to let the whey run off gradually, lest it should carry away with it the "fat of the cowl." As the whey rises it is poured off, and the curd pressed down; after this it is pared, or cut down, three or four times, in slices, about one inch thick, that all the whey may be extracted, and is then scalded in the same manner as Gloucester cheese. In some dairies it is the practice, after the whey is separated, to re-brake the curd, and salt it in the "cowl;" but in others, it is taken, while warm, out of the liquor, and salted in the vat. The thin sorts are disposed, with a small handful of salt, in one layer; thick cheeses, with two handsful of salt, in two layers; and loaves, with the same quantity, in three or four layers; the salt being spread, and uniformly rubbed among the curd. In general, Wiltshire cheese is twice salted in the press beneath which it continues, according to its thickness: the thin sorts three or four "meals;" thicker ones four or five, and *loaves* five or six.

Dunlop cheese is made in the counties of Ayre, Renfrew, Lanark and Galloway, of various sizes, from twenty to sixty pounds. After the milk is brought to a certain degree of heat, (about 100 degrees of the thermometer upon an average, though in summer ninety will be sufficient, as, on the contrary, during winter, a higher degree will be requisite,) it is mixed with the cream which had been previously skimmed, and kept cool; the whole is then poured into a large vessel, where the rennet is added to it, and which is closely covered up for a short time, perhaps ten or twelve minutes. If the rennet be good, it will have effected a coagulation of the milk, which is gently stirred, when the whey begins immediately to separate, and is taken off as it gathers, until the curd become tolerably solid. It is then put into a *drainer*, (a vessel made for the purpose, the bottom of which is perforated with small holes,) and the cover of which is pressed down with any convenient weight. After it has thus stood for some time, and is pretty

* Communication in the Agricultural Survey of the County of Somerset. 3d Edit. p. 247.

† Marshall's Midland Counties. 2d Edit. Vol. I. p. 320.

dry, it is returned into the first vessel or dish, where it is cut into very small pieces by means of a cheese-knife, which is furnished with three or four blades, fixed on prongs from the handle, that cut in a horizontal direction; and it is thus turned up and cut every ten or fifteen minutes, as well as pressed with the hand until all the whey is extracted. The curd is then once more cut as small as possible, and it is then salted, by the hand, care being taken to mix it minutely with the mass. Lastly, it is put into *cheesitt*, or *chessart*, a stout dish with iron hoops, which has a cover that goes exactly into it: a cloth being placed between the curd and the vessel. In this state it is submitted to the action of the cheese-press, when it is occasionally taken and wrapped in dry cloths, till it is supposed to have completely parted with the whey: it is then laid aside for one or two days, when it is again examined; and, if there be any appearance of whey remaining, the pressure and application of cloths are repeated. As soon as it is ascertained that the whey is extracted, the cheese is generally kept for a few days in the farmer's kitchen in order to dry them before they are placed in the store, where a smaller degree of heat is admitted. While there, they are turned three or four times a day until they begin to harden on the outside, when they are removed to the store, and turned twice a week afterwards. After the cheese is cured, various modes are adopted in polishing them for sale, which are rather injurious than beneficial; nothing further being requisite, besides turning them, than to rub them occasionally with a coarse cloth, especially after harvest, because at that time they tend to breed mites.*

It is, however, worthy of notice, that the practice differs, in one material point, in the best dairies; in some of which the cream is carefully separated from the milk, while in others, the milk is allowed to cool, but thickened as taken from the cow; it being thought that, "if the milk be allowed to stand till the cream separates from it, the cream can never again be completely blended with it, or retained in the curd when set, and the cheese is poorer; and this, without great care in the management, to a considerable extent."†

Green cheese is made by steeping over night, in a proper quantity of milk two parts of sage with one of marigold leaves and a little parsley, after being bruised, and then mixing the curd thus *greened*, as it is termed, with the curd of the white milk. These may be mixed irregularly or fancifully, according to the pleasure of the maker. The management is in other respects the same as for common cheese. Green cheeses are chiefly made in Wiltshire.

Skim cheese is chiefly made in the county of Suffolk, whence it is sometimes called *Suffolk cheese.* The curd is broken in the whey, which is poured off as soon as the former has subsided; the remaining whey together with the curd, being thrown into a coarse strainer; and exposed for cooling, is then pressed as closely as possible. It is then put into a vat, and pressed for a few minutes, to extract the remaining whey. The curd being thus drained from the whey, is taken out, again broken as finely as possible, salted, and submitted to the press. The other operations do not materially vary from those adopted in other cheese-making districts, but they are more easily performed on the curd of skim milk, as it is more readily coagulated and separated from the whey, and requires less subsequent care and pressing than that of milk and cream united. The Suffolk cheese forms in general, part of every ship's stores, because it resists the effects of warm climates better than others; but it is remarkable for "a horny hardness, and indigestible quality." A better kind is made in Dorsetshire, although the only perceptible difference in management consists in its being put together cooler; for, by putting milk together hot, and immediately applying the rennet, the whey drains so quickly as to impoverish the cheese, and render it tough.

Cream cheese is generally made in August or September, the milk being at that time richer and fatter than at other periods of the year. Not having the warm season to ripen it, this kind of cheese is generally made somewhat thick, in order to preserve its mellowness. Cream cheeses are more liable than the leaner sorts to accidents, owing to chillness, or the being frozen before they become hard: for when frost once penetrates a cheese, it destroys every good quality, and generates putrefaction, or makes it become either insipid or ill tasted. Hence this kind of cheese should always be kept in a warm situation, and be particularly guarded against frost, and till it has sweated well; otherwise all the advantage of its rich quality will be completely lost.* Cream cheese is, however, in general only wanted for immediate use; and that kind commonly so called is in fact, little else than thick sweet cream dried, and put into a small cheese-vat, about an inch and a half in depth, having holes in the bottom, to allow any whey that may exude, to pass, and having rushes, or the long grass of Indian corn, so disposed around the cheese as to admit of its being turned without being handled. It is thus, that the celebrated *Bath* and *York* cream cheeses are made, when genuine; but the greater part of those commonly sold are in part composed of milk.

New cheese, as it is usually termed in London, or, provincially, *slip-coat*, is, on the contrary, an early summer cheese, which is made of new milk, and about one-third of warm water. When the whey is removed, the curd is carefully kept entire, and spread upon a cloth, to the thickness of less than an inch. It is then very gently pressed, for a few hours only, and when removed from the vat, it is covered with a cloth, and placed in a warm situation, as it requires to be brought forward immediately; the management is therefore different from that of other cheese.

These are the kinds of British cheese, and in most general esteem; the other sorts, together with foreign cheese, are both too numerous and too uninteresting to the generality of dairy-men to admit of detail. The process of making cheese is much more difficult than that of making butter; and the quality depends more perhaps on the mode of performing that operation than on the richness of the milk. The temperature at which the milk is kept before it is formed into cheese, and that at

* Farm. Mag. Vol. IV. p. 381; see also, the Ayrshire Report; and Aiton on the Dairy Husbandry.

† See the Library of Useful Knowledge; Farmer's Series, No. XII. p. 45.

* Twamley on Dairying, p. 64.

which it is coagulated, or turned into curds, are objects of the greatest importance in the management of a cheese dairy: the former ought not to exceed 55°, nor to be under 50° of Fahrenheit's thermometer; and for the latter it should be at 90° to 95°. If the milk is kept warmer than 55° it will not throw up the cream so well as at the lower degree, it is also subject to get sour and give a bad taste to the cheese; and if it be allowed to be much colder than that, it becomes difficult to separate the curd from the whey, and the cheese made from it will be soft and insipid. If the curd be coagulated too hot it becomes tough; much of the butyraceous matter will go off with the whey; and the cheese will be hard and tasteless. The thermometer should, therefore, always be employed in every dairy; and, although the servants may at first be prejudiced against it, yet its evident utility, and great simplicity, will eventually reconcile them to its use.

The greatest care should be taken thoroughly to extract every particle of whey from the curd; for no cheese will keep well while any whey remains, and if any part become sour, the whole will acquire a disagreeable flavor. Similar effects are produced by the use of an immoderate quantity of rennet; it is also apt to blow up the cheese full of small holes; and this last effect will be produced if it be allowed to remain too long on one side.

Sometimes it happens that cheese will *hove* or swell, either from some accident, or from inattention in some part of the process. Mr. Holland attributes it partly to the cows being fed on clover: he also thinks that the cracking of cheese is occasioned by the use of lime on the pasture; but these observations have not been corroborated by general experience. To prevent, as likewise to stop, this hoving, it has been recommended to lay such cheeses in a moderately cool, dry place, and regularly to turn them. Whenever any one becomes considerably swollen, it will be requisite to prick it on both sides in several places, particularly where it is most elevated, by thrusting a large awl, or pin, pretty deeply into it; repeating this as often as may be necessary. Though the pricking, it is observed, will not altogether prevent the swelling, yet it will, by giving a passage to the confined air, render it less considerable, and the cavities of the cheese will neither be so disagreeable, nor consequently so unsightly or unpleasant to the eye.

A very experienced dairyman* is of opinion, that from nine to twelve months' time are requisite to ripen cheese of any kind, if from fourteen to twenty pounds weight; and lays it down as a rule, in the process of making cheese, that the hotter it is put together, the sounder it will be; and the cooler, the richer, and more apt to decay. He also recommends the use of a small quantity of *loppered*, or sour milk, as a preventive of its rising, which is one of the worst accidents to which it is liable. It should be kept in an airy but not in a cold place, and if the moderately dried leaves of the tutsan, or park leaves, as it is provincially termed *(hypericum androsæmum*, L.;*)* or, of the yellow star of Bethlehem, *(ornithogalum luteum*, L.;*)* or, if the young twigs of the common birch-tree be placed on the surface or sides of cheeses they will—especially the tender branches of the birch—be found very serviceable in preventing the depredations of mites. It is a good practice to strew a little dry moss, or fine hay, upon the shelves on which the cheeses are laid; as, when new, they sometimes adhere to the board, and communicate a dampness to it that is prejudicial to the other side of the cheese, when turned: it also promotes their drying. At a more advanced stage they may be laid upon straw; but at first, it would sink into, and deface, the surface. To which we will add, as general maxims—that great cleanliness, sweet rennet, and attention to the heat of the milk and breaking the curd, are the chief requisites in cheese making.

[To be continued.]

* Mr. Parkinson, Treatise on Live Stock, Vol. I. Ch. I. Sect. 12.

From the New York Farmer.

EXTRACTS FROM AN AGRICULTURAL TOUR*

Sheep husbandry in New England.

* * * * *

Elias Taylor, of Charlemont, a shrewd and intelligent farmer, gave me some account of his operations, which I record, because the opinions and practices of observing and intelligent husbandmen, even on familiar subjects, though they may contain nothing original, are worth remembering. He is familiar with the business of fattening sheep for the market, and, as I know from the best authority, has pursued it with great success.

His general practice has been to sell them after shearing. He is of opinion that it is more profitable to buy, for this purpose, wethers than ewes. He prefers merinos on account of the superior value of the fleece; dislikes Saxony for their inferior size; and thinks merinos are kept at less expense than native sheep; chooses to buy them of different ages, and puts them in his pastures, so that he may select such as are suitable, and have them come along in succession; considers five years old as the best age for fattening; chooses to feed them moderately until a short time before he designs to market them, as he thinks they will not pay the cost of high feeding for a long time; often begins to fatten in March, sheep which he designs to market immediately after shearing. His store wethers he is accustomed to keep in the yard with his cattle, upon the orts and husks which are thrown out to them. His wethers for fattening he keeps upon rowen the first part of the season; and after he begins to feed them upon corn, he takes care, he says, not to allow them to be hungry; to feed them with regularity; and never suffers them to be disturbed. His wether sheep often give four pounds of washed wool at shearing.

He mentions an experiment in feeding swine which deserves notice. He put up four swine, and fed them with potatoes and Indian meal, at the rate of three bushels of potatoes to one peck of Indian meal. He boiled the potatoes, and while hot, mashed them with the Indian meal. He then added cold water, and left the mixture to ferment, and when it became sour, he fed his swine freely with it. He says that he never had his

* By the Rev. Henry Colman, of Massachusetts. Ed. Far. Reg.

hogs thrive so well; that they gained surprisingly well; and were fed at a small expense.

* * * * *

I found some superior and well managed farms in this vicinity on the river, [the Hoosic, in Vermont;] and an intelligent and very civil man, by the name of Wright, a deputy sheriff, as I afterwards learnt, and a farmer, at whose house I stopped, was kind enough to give me considerable information of the agriculture of this part of the country. My attention was arrested by the appearance of a small field, covered with the thickest mat of white clover which I had ever seen. I stopped to inquire if it had been plastered, and found this to be the fact. Plaster, or gypsum, is applied to their oak lands with great success; but not with equal advantage to lands where the growth was maple. For this fact, if indeed it be well established, I do not pretend to account. The mode of operation of this extraordinary manure or vegetable stimulant, is still enveloped in mystery. No theory of its operation, though many plausible ones are given, has yet satisfied me. Facts are all that we have as yet got that are of any value. There is every where, in all the processes and operations of the material and intellectual world, a limit beyond which human sagacity cannot penetrate; and from which, however bold and persevering its efforts to pass may be, it is invariably driven back with the humiliating consciousness of its own impotency and ignorance. The grass and oat crops were highly luxuriant; and making due allowance for the extraordinary season, (1832,) Indian corn appeared remarkably well. The haying season had just commenced. The grass was principally herds grass and red top. The crop appeared heavy; they mowed, however, only once, as they were accustomed to feed their meadow lands closely and very late in the season, oftentimes into June, which, upon the whole, they deemed a bad practice; and they were of opinion they should get more hay by two mowings.

Large crops of oats and corn might be obtained by different management. The crops were estimated by Mr. Wright to average thirty-five bushels of oats, thirty-five bushels of corn, and two tons of hay to the acre. This, however, was probably only a conjectural estimate, as few farmers ever take the pains to weigh or measure any thing. Their produce is applied chiefly to the feeding of sheep. The yearly expense of keeping a sheep is estimated at one dollar. This likewise must in general be mere matter of conjecture. It can only be accurately determined by a careful estimate of the actual value of hay and grain; and not their market value, but their value consumed on the place, making due allowance for the valuable returns of manure; and there must enter into the estimate the labor of attendance, the value of pasture land and fencing; and then, too, a careful ascertainment of the amount of pasture required for, and the amount of hay and grain consumed by a sheep, and necessary to his profitable condition. Now these are calculations into which few farmers have the patience to enter; and one dollar per head is therefore only a conjectural estimate of the cost of keeping a sheep, formed from no accurate standard; and you can only infer from this statement, that they find their husbandry profitable, or yielding a satisfactory return at the close of the year, when they can receive for the pasture occupied, and the hay and grain consumed, by a healthy sheep, the value of one dollar. It has been found by actual experiment, that seven healthy sheep will consume one ton of hay in 135 days, the average of our winter foddering—or a little more than two pounds each per day. If we value this hay at six dollars per ton, and this is certainly, considering the cost of labor, a low price, the cost of the hay consumed by each sheep would be 85 cents. We have then about 33 weeks of pasturing to provide for, which cannot be rated at less than one and a half cents per week—or say 50 cents—which would make the keeping of a sheep, even at low rates, equal to one dollar and thirty-five cents per year. I make these calculations to show how careless almost all conjectural estimates are in matters of this kind. Whether however, his pecuniary estimates are critically exact or not, if the farmer at the close of the year is satisfied with the balance of his receipts over his expenditures, if he is so fortunate as to find the balance on that side, he may be well contented with his numerous privileges and blessings, though his gains in arithmetical amount may seem small compared with those of other trades and professions.

The amount of wool obtained from their sheep averages about three pounds of fine, their sheep being principally of the merino and Saxony race; and sold this year at 42 cents per lb. A Mr. Wright, neighbor of the one above named, has a flock of 700. His annual loss by disease or accident is a very small per centage, which he attributes to the circumstance of his never housing his sheep at any season, as he was formerly accustomed to do. His opinions and experience in this matter are entirely at variance with the opinions and experience of many distinguished and successful sheep farmers; and especially of one, whose authority on this and various agricultural subjects, from his experience, education and intelligence, is entitled to great respect; I mean Mr. H. D. Grove, of Hoosic. He says, "shelter against the inclemency of the weather is almost as necessary to the health and good condition of the sheep as food itself; and for this reason stables built for that purpose are of great benefit. Not only do sheep do much better, but it is also a great saving of fodder and manure." Mr. Wright's lambs are yeaned in May. His wool is sold on the farm. The general appearance of this farmer's grounds and crops attracted my particular attention as highly creditable. The intervals furnish abundant crops of hay and grain, and the neighboring hills afford pasturage in plenty of the best quality.

* * * * *

Comparative value of different kinds of corn—what crops to manure.

* * * The corn cultivated here [near Stillwater in New York,] is of the eight rowed kind; rather a small ear; and though not white, yet not of that deep yellow which we sometimes see. This corn was recommended for the small size of its cob; but I am disposed to believe, from some careful examinations, the results of which were communicated to the public through the columns of that admirably conducted journal, the Genesee Farmer, that the weight of cob in the different varieties of corn will be found to bear a pretty equal

proportion to the weight of grain upon it; and in this matter, therefore, the small will be found to have no advantage over the large ears. I speak particularly of the flint corn, having made no examination of the gourd seed varieties, where I suspect the advantage will be perhaps more in favor of the large ear. There is however one advantage on the side of the corn with a small cob, which deserves much consideration. The corn with the small cob is more likely to be dry and sound, and becomes merchantable earlier than that with a large cob. The large cob retains its moisture much longer; and where the season is backward, or the corn late, or where it is harvested by being cut up at the bottom while the stalks are green, and ripened in the stack, there is danger, especially if the season be unfavorable, of its not drying sufficiently, and of its becoming mouldy in the bin. I have known serious losses to accrue from this circumstance, especially where the corn after being husked had been placed in large heaps, and the granary not well ventilated. This, in fact, is the only objection I have to what is called the Dutton corn, so much commended by Judge Buel, and of which he has exhibited at the agricultural shows some splendid samples; and also to other twelve and fourteen rowed varieties. This circumstance, as I have recently learned, has induced some very intelligent farmers in New Hampshire, on the Connecticut river, to give up the cultivation of the Dutton corn for the eight rowed varieties. The large twelve rowed corn will, I believe, produce ordinarily more bushels to the acre than the small eight rowed corn. A good sized ear of the twelve rowed will yield more than half a pint of shelled grain; one of the small eight rowed will not exceed a gill. A field of the twelve rowed will yield generally one good ear to a stalk; a field of the small eight rowed will do no more; for I have not found, in my own cultivation, that the eight rowed is more likely to produce two ears to a stalk than the twelve rowed. Its producing two ears in either case, depends, in my opinion, something upon the selection of seed from twin-bearing stalks, but more upon wide planting; as corn which is crowded or closely planted will very rarely produce more than one good ear to a stalk; if there is a second, it is commonly imperfect, and a mere nubbin. It is obvious, then, that the twelve rowed corn will yield more than the eight rowed to the acre; but it will not yield twice as much, because the small kind will bear much closer planting than the large kinds, as the stalks and leaves are not nearly so luxuriant. The kind grown in this part of the country was remarkable for its low growth, and the ears being set very near to the ground, the stalks being in this case small, the fodder is more easily saved, but the yield of herbage is much less to the acre. It may be expected on this account to ripen earlier. The small amount of stalks and leaves is, I believe, attributable to their not manuring their corn lands, rather than to any peculiarity in the kind of corn. That high manuring in the same year of planting the corn will produce a great amount of stalk and leaf, is well known; but that the actual yield of grain is always in proportion to the luxuriance of the plant, is a point not so well established, and upon which I should be extremely glad of the opinions of observing and practical farmers. That the extraordinary luxuriance of the plant will delay the ripening of the grain is certain. Market-men near our large cities understand this, as they never manure the peas which they wish to bring forward very early; and it is a common observation, how well founded I will not say, that the very high manuring of potatoes causes them to "run too much to vine;" and the quantity of potatoes in the hill is not always in proportion to the luxuriance of the tops.* Whether in such cases, if the season were long enough to admit of the perfect maturity of the plant, the yield of grain and of tubers would not correspond with the great luxuriance of the herbage or stalks, is another query which grows out of the subject, and deserves inquiry and attention, as it is a matter of great practical importance to ascertain, if possible, (which can only be done by long observation and experiment,) to what degree corn, potatoes, or other plants, may be safely and advantageously forced by manure, with a due regard to the actual return in grain or tubers. I have spoken above of the small varieties of the eight rowed corn, though not of the smallest. The Hoosic corn is larger than what is called the Canada corn, though probably it is the same, and has acquired a larger size from successive planting in a lower latitude. The ear is about ten inches in length. A kind of eight rowed corn is grown on the Deerfield meadows, which frequently measures sixteen inches in length, and from a single ear of which I have sometimes obtained a full pint of grain. It ripens late, however, and requires early and very wide planting. On our fine alluvions, with high manuring, it yields about fifty bushels to the acre. It weighs from fifty-seven to sixty pounds to the bushel, whereas, my twelve rowed and a small eight rowed corn, which I have grown upon a thin soil, weigh from sixty to sixty-four pounds per bushel.

Another inquiry connected with this subject deserves attention. Is the color of the corn any index of its nutritious properties? This is a subject for experiment, and for chemical analysis. Between the varieties of the yellow and the white flint corns, I have made no experiments. The prejudices in favor of the one or the other in different parts of the country, where the one or the other is cultivated, are strong, and as in most other cases exactly coincident with the interests or habits of different individuals; those who grow and eat the yellow pronouncing the white tasteless, and those who grow and eat the white, with the same self-complacency, disdaining the yellow. But between the yellow flint of the northern states, and the white gourd seed of the south, I am inclined to believe there is a difference in nutritious properties in favor of the former. This opinion is formed only on a single experiment, which I made some years ago; but of which I preserved no written record, and can only state it from memory,

* These views accord with the reasons given in a former No. of the Farmers' Register, (p. 257, Vol. I.) in favor of applying manures, in preference, to those crops in which general bulk is wanted, instead of those of which the quantity of seed is the object—or, for example, to the crops of grass, in alternate husbandry, rather than to the wheat or corn which follow them.—Ed. Far. Reg.

and therefore not with that minute accuracy which I should desire in all such cases to observe. I had a cow, which I put in the barn in October; fed her abundantly with hay, and gave her four quarts of meal per day of the yellow flint corn; saved all the milk, and weighed her produce in butter, which during the week was nine pounds. The second week her feed was the same as before, excepting that the meal given her was the meal of the white gourd seed, or what goes among us by the name of Virginia, or southern flat corn. Her produce this week in butter fell short of eight pounds. The third week I fed her as before in quantity, and returned again to the meal of the yellow flint corn; and her produce in butter was as the first week, nine pounds. I took the exclusive care of her myself during the time, and can assign no cause for the difference in the product but the difference in the quality of the meal. There may have been other causes, however, and I by no means regard a single experiment as decisive on this or any similar subject. The meal in the several cases was measured, but not weighed; the actual quantity given, therefore, though it appeared the same, might not have been the same; and I record the experiment because I deem all such trials, where all the circumstances connected with them are detailed, of some value; and in the hope that it may induce others to make similar experiments in other matters as humble; for which experiments, if they speak of them, they may get nothing from their overwise neighbors but the sneers of real ignorance, indolence, and self-conceit, the usual attendant of ignorance and indolence, but from which they will derive themselves much pleasure and satisfaction. They are attended with little trouble or expense, and from them, in some cases, the most important results may be obtained.

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The land, as I approached the Hudson, became thin, and strongly predominating with sand, though favorable to Indian corn, and well suited to the renovating influence of clover and gypsum; that beneficent operation by which much of the land in Columbia county, in the neighborhood of Kinderhook, has been converted from pine barrens into highly productive fields; and according to the interesting and gratifying account of Mr. Teunis Harder, given in the Quarterly Journal of Agriculture, Vol. I., No. 1, p. 32, has actually raised the value of these lands from three to sixty dollars per acre.* Nearer the river the character of the soil became much better, and within a mile of the ferry I found a superior farm, in high cultivation, belonging, I have since been informed, to a Mr. Knickerbocker. The corn crops here were very promising. I have since passed this farm, and its condition is highly creditable to its owner. I have seen, too, in this neighborhood, a herd of uncommonly fine swine; indeed, for store hogs, as many together, I have seen none superior in appearance.

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I crossed the Hudson at this place in a ferry boat impelled by a horizontal wheel, moved by two horses. The horses had been several years attached to the boat, and though unable to see the shore, they measured the distance with great accuracy, stopping of their own accord at such a distance before they reached the shore, that the impetus which the boat had already received was nearly sufficient to carry it to the land, and when ordered to start again, turning it only one revolution and stopping again without direction. I could not help wishing that men were half as tractable.

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Earl Stimson's Farm.

A principal object of my journey soon presented itself at a distance of two miles, which was the farming establishment and residence of Earl Stimson, Esq., whose dwelling house and numerous out-buildings, placed on a commanding eminence, had more the appearance of a village than the domain of a private individual. His buildings consist of a spacious dwelling house, with extensive piazzas in front, several barns and stables, very extensive sheds, a large store, a three story building for a granary, cider house, &c.: a large slaughter house, cooper's shop, potash establishment, blacksmith's shop, and smaller dwelling houses, which, with the fame [farm?] connected with them, had come into his possession, and might now be said to form a part of his domicil.

The situation, being at the rectangular junction of two large roads, was favorable to the prosecution of his business as an extensive trader, and the keeper of a large hotel. The homestead includes about seven hundred acres, two hundred of which are in wood; and the rest in meadow, pasture, or under the plough. He has himself favored the public with an account of his management and cultivation, in his address to the Saratoga Agricultural Society; and an exact and detailed statement of the produce and course of crops of a certain portion of his land is given by Dr. Steele, in his survey of the agriculture of Saratoga County, in New-York Memoirs of Board of Agriculture, Vol. II., p. 69. I shall, however, detail from recollection the accounts which I received from himself; and record such remarks as suggested themselves on the premises.

The soil is generally of a dark loam, resting upon sandstone and carbonate of lime. The analysis of this soil, as given by Dr. Steele, is subjoined:

Water,	9.5
Animal and vegetable matter,	12.5
Alumine,	17.5
Siliceous sand,	54.
Carbonate of lime,	3.
Soluble salts,	1.
Oxide of iron,	1.
	98.5
Loss,	1.5
	100.

The great roads passing through the farm, and crossing at its centre at right angles, give a straight line to all the outside fences; and the fields, every where divided into rectangular lots of eight

* This account was first published in the Farmers' Register, (p. 544 Vol. I,) and we presume was copied into the work to which it is credited above—which however we have not seen.—Ed. Far. Reg.

or ten acres, are enclosed by stone walls, formed of small stones gathered from the land, and surmounted by posts and two rails. The cultivation exhibited an exemplary neatness, as in but a single instance did I remark any weeds or briars growing near the fences; and these had been recently mowed.

Mr. Stimson is highly systematical in his farming, and pursues a determined rotation of crops, beginning usually with wheat, then corn, barley, clover, and herds grass two or three years; then frequently depastures his fields for one year, after which they are again subjected to the plough, following the same rotation as before, excepting that corn is sometimes a first crop after the land is broken up; and flax sometimes takes the place of corn or barley in the rotation.

He manures his land once only in six years, excepting the application of plaster to his corn. He allows five loads of barn manure, and three of leeched ashes, to an acre; and this is always spread upon the surface after ploughing for the first crop and either harrowed or ploughed in by a very light ploughing. In ploughing, he never permits the plough to go deeper than three inches; the sod is turned over flat, and then rolled, it being his great object to keep all the vegetable matter on the surface. In the ploughing for the second crop in the rotation, the sod being completely decomposed, is turned, and affords a fine soil for the ensuing crop. Though a good deal of the manure is in this way lost by evaporation, yet he considers this loss as much less than that which is occasioned by burying it under the sod. He deems leeched ashes a most valuable manure, and much to be preferred to that which is unleeched, which he considers as having a tendency at first to force the land, but in the end to impoverish it. Next to leeched ashes, he deems lime the best manure for land. The opinions of so intelligent, experienced, and successful a farmer, are certainly entitled to the highest respect, and we shall not undertake to theorize on the subject; but the subject is still matter for experiment, and deserves the most careful and philosophical investigation.

Wheat is generally the first crop in the rotation, in which case it is usually sowed in the autumn; and harrowed in at the rate of two bushels to the acre. His average crop is from thirty to forty bushels per acre. This year (1832) he has sixty acres in wheat. Of Indian corn, his average product is about five thousand bushels. He assured me that for the last ten years it had exceeded the average rate of one hundred bushels to the acre. He plants an eight rowed kind, with a small ear, on the ground where he has had wheat, in hills two feet eight inches apart each way; the places of planting being accurately marked out by a simple machine with four teeth, like a rake, and drawn by a horse, which marks the piece to be planted in one direction, and then crosses these marks at right angles. Four stalks only are left in a hill, and it is ploughed slightly, or harrowed twice. Sometimes plaster is applied to the hill, at the rate of about five pecks to an acre. He is of opinion that too much manure may be applied for any crop excepting corn. This cannot be manured too highly. Owing to the unfavorableness of the season, his corn, much of which had been planted twice, seemed quite small, and in his opinion would hardly yield him a third of the usual crop.

Potatoes are planted by him at the same distances as his corn, and on the outside of his cornfields. At the second hoeing of his potatoes, he takes pains to open the top of each hill with the foot, and to put a hoefull of dirt directly on the centre, by which means the sun is admitted to the potatoes, which he deems likely to contribute very much to the increase of the crop. This simple operation is in accordance with Mr. T. A. Knight's lately broached views of the great importance of light and air to the productiveness of the potato crop; but in a partial experiment, I have not myself perceived any sensible advantage from it. His average yield of potatoes is about five hundred bushels to an acre; and he raises yearly about two thousand bushels.

Flax is likewise a valuable crop, of which he calculates to obtain at least twenty bushels of seed, and four hundred pounds of flax; commonly more than this. His flax fields, which he was then pulling, with a platoon of sixteen men, exhibited a most luxuriant growth. After the flax is pulled and rotted, he has it cleaned and prepared for market, for two and one-half cents per lb. What he usually obtains over six cents per pound for flax, will pay for the cleaning of it. He is of opinion that it will do to repeat flax on the same land once in six years. Barley, or rye is another crop in his usual rotation, and ordinarily follows corn. Barley he considers as much the best crop with which to lay down his land to grass.

His plan of laying down his land to grass is to sow the grass seed at the time he sows his barley, at the rate of 3 lbs. of clover seed, and 4 quarts of timothy or herds grass. His crop of grass averages about two and a half tons to an acre. He feeds many of his mowing fields until the 10th of June. His grass, as I saw it, was quite ripe, and farther advanced than we are accustomed to have it at the time of mowing; and this, perhaps, accounts for his practice of cutting his grass in the morning, and housing it at night of the same day, which he informed me he frequently did. The proper time of cutting grass, as with reference to their nutritive properties, is a subject which has not received all the attention which it deserves. According to chemical analysis, some grasses are much more nutritive after their seed is perfected, than when cut in the flower. It is the reverse with other grasses. In respect, for example, to timothy or herds-grass, (Pheum pratense,) according to Sinclair's table annexed to Davy's Agricultural Chemistry, it is said that "the nutritive powers of the straws simply therefore exceed those of the leaves in proportion as 28 to 8; and the grass at the time of flowering, to that at the time the seed is ripe, as 10 to 23; and the latter math to the grass of the flowering crop, as 8 to 10."

Mr. Stimson mows his grass land usually two years; and pastures it the ensuing year. This completes his rotation of six years, and he then begins the same course again. Thus,

1, Wheat—manured.
2, Corn—plastered.
3, Flax, rye, or barley.
4, Clover and herds grass.
5, Clover and herds grass.
6, Pasture.

His potatoes are usually planted round his corn fields, three or four rows on each side, so as to render it convenient to come out with a horse, and turn the plough. He puts one large or two good sized potatoes in a hill. He steeps his seed corn before planting, in a mixture of $\frac{1}{4}$ lb. of saltpetre, to 3 pints of water; and then rolls the seed in plaster.

He purchases large numbers of cattle in the fall; those which are in condition to kill, he slaughters and packs; and it is then forwarded to the New York market, where it is repacked, inspected, and fully salted, at the expense of 75 cents per barrel. The cattle not in condition for beef, he winters, and disposes of the next spring and autumn.

He kills and packs great quantities of pork, and bacons the legs. For packing his beef, he uses four quarts of salt, with some saltpetre; and for his pork, fourteen quarts of salt to each barrel, which he deems sufficient to keep it until it is repacked in New York. He considers this a better mode of disposing of his pork and beef, than to send his cattle on the hoof, or his pork unsalted, to market.

His preparation for his hams is 4 oz. saltpetre, 4 qts. of salt, 1 pint of molasses, 1 oz. of pearlash, to 100 cwt. of meat. They are to be smoked three weeks with maple or walnut wood. Recently he slaughtered twenty hogs, whose average weight was 414 lbs. each. His hams are preserved by being sowed in paper, or coarse bags, whitewashed, and suspended in his storehouse. He has at present 700 sheep, which he considers as a profitable stock. He has thirty cows. He has paid little attention to the improvement of his stock, selecting his cows from the numerous droves which he purchases for feeding or slaughter. He never puts his young cattle in the barn. He has large and commodious sheds for their protection; and he would always choose to have wooden floors in the sheds for them to lie upon. He chooses to keep his different kinds of stock separately from each other: his milch cows in one yard, his young cattle in another.

With his laborers he always makes a written agreement, stipulating to board them, but furnishing no ardent spirits; and requiring of them good manners and good temper; early rising; a readiness to assist in husking in the evening, and to do any extra job which may be customary on a farm; and an attendance upon public worship in their turn.

Such were a few hasty and cursory observations which occurred to me in a short but highly gratifying visit to his interesting and instructive establishment; and I beg leave to express my grateful sense of the kindness and hospitality which I received, and the politeness with which the information I sought was communicated to me. In extent, in productiveness, or in its admirable management, I have seen no individual establishment to be compared with it. In extent, I except the magnificent farm of Mr. Wadsworth, in Genesee, which is confined to grazing, and where, a few years since, for it is some time since I had the gratification of visiting it, not a bushel of wheat was raised. As a dairy farm, likewise, that of Mr. Bussey, at Hoosic; and the grand establishment of Robert Smith, Esq., near Baltimore, where one hundred cows were soiled, are likewise before it; but I speak of it in respect to the variety of its business, cultivation, and products: and the skill, system, and success, displayed in its management.

Mr. Stimson has peculiar advantages in his abundant capital: in the profitable consumption of a large amount of his produce by means of his hotel, which is much frequented; in a most abundant supply of manure from his stables, slaughter house, piggery, and potash establishment; and in his facilities for procuring labor. But I saw no part of the process of his farming, which may not be copied by other farmers, on a smaller scale; and, especially as he does not apply a larger amount of manure to an acre than what is applied in other cases by many farmers.

The great points of difference between his own and the management of other farmers, and almost all other farmers, deserve particular attention. They consist, first, in the regular arrangement of his lots, which are all laid down upon a plan; and the management of each pursued systematically; and made matter of exact record.

Secondly, in his shallow ploughing, by which the vegetable mould is always kept in its proper place; or what he says, nature teaches is the proper place, on the surface.

Thirdly, in the incorporation of the manure with this vegetable matter, instead of burying it amongst the gravel or loam.

Fourthly, in his exact and systematic mode of planting; his corn being as regularly deposited as straight lines can make it.

Fifthly, in his economy of labor, his ploughing after breaking up the green sward, which is done by two horses, always being performed with one horse to a plough. He informed me that the last spring, with eight horses, he set eight ploughs in operation.

Sixthly, in his pursuing with each piece of land a regular rotation of crops. In this way the land is taxed but once in six years for the particular qualities in the soil, demanded by each particular crop; and by being three years in grass and clover, a new supply of vegetable matter is left upon the surface, to be turned under for its improvement, preparatory to a second rotation.

His ploughs are an improvement upon the Scotch plough, and of very easy draught. Of other utensils, I remarked none of a peculiar construction. He has a superior cider mill, and made last year from his farm five hundred barrels of cider. He has contrived a saw to go by horse power, with which he says two men, a boy, and a horse, are able to saw thirty cords of wood per day for the fire.

His men breakfast at six o'clock; dine at 12 M.; and sup when work is done at night. A large party of them were at work in the field nearly a quarter of a mile from the house, pulling flax, soon after 4 o'clock in the morning. He furnishes them a luncheon of bread and butter, or bread and cheese, in the field, at 10 o'clock, A. M. and 4 o'clock, P. M. Their drink, consisting of cider, cider and water, molasses and water, milk and water, is carried to them in the field. Above all, his farming, as well as all other of his operations, are under his constant and immediate supervision. To the inquiry, who was his foreman, his answer was, that he had no foreman; he was his own foreman. To every man was assigned his proper task, which he was expected to perform, so that the responsiblity rested upon himself alone; and under this conviction, he was the more likely to be faithful. I quitted the place with a just admiration of its extraordinary management, and not without a deep surprise at the system, skill, care, and success, with which such heavy and various concerns were carried on, and a press of business maintained and conducted, under which ordinary men would have been overwhelmed and confounded; the cumbrous and complicated machinery making its gyrations and movements without dislocation, without friction, and without any sensible concussion or jarring of the moved or the moving body.

Extract of a letter to the Editor of the Rail Road Journal.

SWIFT CANAL BOATS—STEAM CARRIAGES ON COMMON ROADS.

When at Glasgow I visited the "Paisley" and the "Forth and Clyde" canals; and as our country is very much interested in canal navigation, some memoranda relative to the *swift passage boats* on those two canals may not be uninteresting to your readers.

First, of the "Paisley canal," which has been the longest known, and is still most successful as regards quick travelling. This canal commences at Glasgow, and goes through Paisley (eight miles distant) to Johnston, where it terminates; 12 miles long; no lock in the whole distance. The boats are of iron, of one-sixteenth of an inch thick, 70 feet long, five feet nine inches broad, and weigh 16 cwt. 14 lbs. This is the weight of the iron part alone. The total weight of the boat, including the wood work, (the cabins are of this material,) fixtures, &c. is 33 cwt.; and with 100 passengers, draws 19 inches aft and 18 inches forward. Two horses draw the boat in stages of four miles each; the pair of horses go only 12 miles per diem. There are four boats, which make six journeys each, or twenty-four journeys for the whole, each day. These boats have been running four years. They are generally full. They meet the greatest encouragement, and are very profitable to the proprietors, notwithstanding the fare is so very moderate. The charge is six pence, in the after cabin, and nine pence in the forward, to Paisley, eight miles; to Johnston, 12 miles, the charge is nine pence in the after cabin, and 12 pence in the forward cabin. The time usually employed between Glasgow and Paisley is 50 minutes; or $9\frac{3}{5}$ miles per hour. This is the narrowest canal I ever saw, generally 30 feet wide and five feet deep. The captains of the boats on board of which I travelled, told me that on a narrow canal, such as this, the horses can pull a boat easier, *when travelling rapidly*, than on one of greater section. This, paradoxical as it may appear, is verified by the fact, that on the "Forth and Clyde" canal which is of nine feet depth, and 68 feet breadth, the boats, which are of nearly the same dimensions (68 feet long, and $5\frac{1}{2}$ feet broad,) as those on the Paisley canal, are drawn by three horses, with 70 passengers on board, and yet travel at about the same velocity as on the narrower and shallower canal. I asked these captains, and also a civil engineer of some eminence, whom I met on board, returning from Johnston, how they could account for this circumstance. Their reply was as follows: on a narrow canal, say 30 or 40 feet wide, the boat passing swiftly through the water, throws the wave against the shore, which being thrown back again against the boat, raises it up, and thus propels it. The wave strikes the boat about two-thirds of its length from the bow. But if the canal were much wider, the boat would pass by before the *reflected wave* could reach the boat, and thus give it aid. I give this explanation nearly in the words of these captains, and am responsible only for the correctness of the report of what they told me. I hope this will meet the eye of our distinguished countryman, Gen. C. F. Mercer, chairman of the Committee of Internal Improvements in the House of Representatives, who advocates with so much ability *broad* and *deep* canals for transportation, as far more economical than narrow canals. I will now finish what I have to say respecting the fast travelling on the "Forth and Clyde" canal.

This canal, as I have said above, is 68 feet broad by nine feet deep, and the iron boats are 68 feet long and $5\frac{1}{2}$ feet broad, and when light draw eight inches water, but with 70 passengers draw 20 inches; this is when in a state of rest—when in rapid motion they draw less. There are three horses employed to each boat, and the passengers who get into the boats at Port Dundas (Glasgow) are set down at Port Hopetown (Edinburgh) in $6\frac{1}{4}$ hours, a distance of 56 miles, or nearly nine miles per hour. It is necessary to explain to you that the passengers go only a part of the distance on the "Forth and Clyde" canal. They start from Port Dundas and go to Port Downie, (the commencement of the "Union Canal,") a distance of $24\frac{1}{2}$ miles, which includes four locks. In the next half mile are eleven locks, which are avoided by the passengers being conveyed in omnibuses to boats in the "Union Canal," which carry them on a level of 31 miles to Port Hopetown (Edinburgh.) I regret that I did not take a memorandum of the cost of these iron boats, which are light and beautiful vessels, and being fearful of making a mistake I do not quote from memory. On the Lancaster, Carlisle, and Kendal canals, there are rapid boats, but not having travelled by them I do not give you any details. But if any of your readers feel an interest in the above remarks, and wish further information, I can with facility procure it, and will with pleasure communicate it to you.

Since my return from the north I have called on Mr. Hancock, in company with Mr. T., one of the engineers of the Boston and Providence Railway. We found that for the last two months the "Era" and the "Autopsy" have discontinued running, owing to the absence of Mr. Hancock in Ireland, whither he went with the "Era," for the purpose of ascertaining if he could profitably introduce locomotives on the roads of that country. He is now returned to London, and will, I am informed, recommence running these two engines on the metropolitan roads in a few days. Mr. T. and I also went to see Mr. Russell's steam carriage, recently arrived from Glasgow, which will in a few days ply regularly, in conjunction with others of this gentleman's make, between Hyde Park Corner, and Hammersmith (the commencement of the great western road out of London.) This carriage is by far the most tasteful of all the steam carriages I have seen. It is built exactly like the stage coaches of this country, except the dimensions are larger. The whole of the machinery is in the hind boot. The water and the coke are in a *tender*, or separate carriage on two wheels, behind the locomotive. This steam coach will carry six inside passengers sitting *viz-a-viz*, 14 outside on the roof, and six on the tender; total, 26 passengers. From the favorable terms in which I have heard Mr. Russell's engine spoken of, both here and in Glasgow, I feel a great curiosity to ride on it, and I will take advantage of the first opportunity to do so, and will report to you respecting it, as well as others which will no doubt be introduced as the spring advances. You may inquire, why did not Mr. R. remain in Glasgow? I will reply in nearly the words of the gentleman who showed us this carriage. He said the prejudice against it was great, in consequence of the unfortunate accident by which 12 or 13 passengers were killed or wounded; that it was expedient to come to a distant part of the country. He told us, that for several months this engine plied between Glasgow and Paisley, and performed in a manner to give entire satisfaction; and in consequence, the stage coach proprietors and trustees of the road were alarmed lest this and others would gain so much in public estimation as to become regular coaches. They therefore resolved to drive it off, if possible. This they accomplished by *picking up* the turnpike, and putting fresh metal down in unusual and extraordinary quantities. Notwithstanding the road was made almost impassable, the engine was still continued, and plied regularly several times each day for a whole month, and excited the admiration of all intelligent persons, that it *could* overcome such difficulties. It however was finally injured by being driven for so long a time over a *road so much worse than it was constructed for*, and one of the hind wheels getting into a hole (made by order of the turnpike proprietors,) it broke, and the carriage tumbled to the ground; four or five persons were killed, and eight or nine others seriously maimed and wounded. But none of them were hurt from the explosion of the engine, or the escape of steam, but from being thrown with great violence against the rough, new mettled road—the same kind of injury as would be received from a common stage coach breaking one of its wheels when travelling rapidly. I am informed that an action is brought by the owners of the steam carriage, as well as by several of the survivors and the friends of the deceased, killed by this melancholy event, against the road company, for obstructing the King's highway, and causing the injury and death of a number of persons, besides loss of property. Sanguine hopes are entertained that the guilty will be severely punished.

I forgot to tell you above, that the swell on the two canals, caused by the quick passage of the boats, is very inconsiderable.

I am, very respectfully,

Your obedient servant,

GERARD RALSTON.

P. S. The demand for railway locomotives is very great. I am sending nine to different parts of the United States, and both Mr. Robert Stephenson and Mr. Bury have orders to give them full employment for several months to come.

MEMOIR ON THE MAKING OF WINE IN THE CANTON OF MARCILLAC.

By M. Charles Girou de Buzareingues.

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francaise.*

The vintages which continue about three weeks, generally take place in the course of October. More intent upon the quantity than the quality, the proprietor bestows little care upon gathering only the ripe and sound grapes. The vintage is seldom interrupted, or suspended, to wait for the perfect maturity of the fruit; in from fifteen to twenty days the whole is finished in the vale of Marcillac, and the vintage scarcely lasts four or five days in the same vineyard. It is not thus that the work is performed in the vine lands which furnish the good qualities of Bourdeaux wine: there they pick constantly, and the vintage continues for one or two months. No great advantages, it is true, would be obtained at first by similar care in the vale of Marcillac, but in the end it would be found not wholly useless, for complete ripeness was never yet a defect.

The vintager receives for hire 20 centimes a day, and his food, representing a value of 50 centimes.

The grapes are carried from the vineyard to the vat in double panniers, which are placed upon cushions of goat skin, of a triangular form, with the angles rounded. Seen underneath, these cushions represent, towards the sharpest of their angles, a cap or hood to receive the top of the head, and towards the opposite side two small cushions near together, designed to protect the shoulders on which the two divisions of the pannier rest. The head of the porter being placed between these divisions, the pannier is prevented from slipping back by a band of osier attached to its two divisions, and against which the anterior angle of the cushion presses. This pannier, which together with the cushion, weighs five or six kilogrammes, contains from 40 to 45 kilogrammes of grapes.

It is wonderful to see the porters, under this heavy burden, descend at a rapid pace, with the aid of a long staff, from the top to the bottom of the vineyards or climb up them by goat paths, and often traverse more than half a league without relaxing their speed.

If we judge of them by their gait when they return unloaded, to the vineyard, they do not then feel so much the necessity of hurrying themselves.

Their stature generally corresponds with the muscular force required by their employment, which is at once laborious and dangerous.

The number of porters is determined by the abundance of the crop and the distance of the vineyard from the cellar. When this distance is great, oxen are used to haul the grapes which, in this case, are put into a large tub placed upon a cart. The porters then, have only to carry the grapes from the vineyard to this tub which is generally not far distant; their task, however, is not therefore lessened, for they are fewer and more frequently obliged to go up and down the steep paths of the vineyard, the most dangerous and most difficult part of their work. Their wages and food agree with their service; they receive, per day, from one franc twenty-five centimes to one franc fifty centimes, and they make eight or nine meals, which, together, are worth two francs at least. We are, at first, no less astonished at their digestive capacity than at their muscular powers; but the one is soon explained by the other.

When the grapes reach the cellar they are poured, generally without being stripped from the clusters, upon a table pierced with holes, surrounded by high raised sides and furnished with a trap-door. This sort of chest is fixed upon handles, by the help of which it is carried like a hand-barrow, and placed horizontally on the vat; it is called *gabio*, which signifies a cage.

A man, who receives the name of *gabrazre*, because he works in the *gabio*, enters it with naked feet and legs, and tramples the grapes. When the operation is ended, he opens the trap-door and throws into the vat whatever has not already fallen through the holes of the cage.

This trampling is not practised by all the owners of vineyards; there are some who pour the grapes at once into the vat, where they are afterwards crushed as well as their situation will permit.

Some proprietors strip a portion of their grapes from the clusters. My honorable friend, M. de Cabnères performs this operation upon all his. He has a double bottom fixed above the grapes which keeps the *œne* beneath the surface of the liquid; and a cover or lid placed and luted upon the vat prevents all evaporation. The results obtained by this intelligent proprietor establish beyond a doubt, that the wines of Marcillac might take their place among the good wines of France, if in the vine lands of this name the culture of the vine and the making of the wine were directed by men like him.

The question, however, whether it is proper to strip or not to strip the grapes from their clusters cannot be determined by the success of a single individual in a tract composed of such a variety of grapes, soils, and exposures. The introduction of the clusters whole, facilitates fermentation, and, by the principles which it furnishes to the wine, gives it sprightliness, renders it piquant and lessens its tendency to become thick or oily, *(tourner au gras.)* In these respects it becomes useful, when without it the wine would be very weak and tasteless, and could not be preserved without difficulty; and consequently it is proper on the hills where a sweetish taste predominates, and from which only a wine of very weak quality can be expected. But it is not the same with the crops in which *aroma* and sugar abound, at least sufficiently to enable us to calculate upon a generous wine, agreeable to drink, and easy to be kept by the ordinary processes of racking, [*mutage*] and fining. In such situations it is proper to get rid of the astringent principle. It may then be of advantage in one place to strip all the grapes from the clusters, in another to strip only a part of them, and in a third not to strip any; and each person ought, in this particular, to pursue the lessons of experience, taking care to modify his practice when the circumstances under which it was established are no longer the same. It might have been proper formerly to strip off the grapes of a particular vineyard when it was planted in *menu* and received but little manure, while this would no longer suit since it is planted in *moissagues*, in *maural*, in *canut*, or other varieties which produce only flat wines and since it receives much manure.

The fermentation generally goes on in an open vessel, whence it follows, first, that the *must* does not contribute at all, or it contributes very little by its own oxygen, to the formation of the carbonic acid gas, and that a less quantity of this gas is absorbed by the wine: secondly, that the *must* loses more of its carbon; that its hydrogen and oxygen may be united in greater quantity to form water; that alcohol is produced in less abundance; that the evaporation of this as well as of water is greater, that, in fine, there is less wine, and that this wine is of weaker quality.

The grapes generally remain ten days in the vat: the duration of this stay is abridged or prolonged according as the weather is warm or cold, and the ripeness of the grapes more or less complete. When, from the abundance of the crops and the want of vats, it has been necessary to remove the wine before its fermentation was entirely over, the result has been a better wine, but more disposed to become thick, doubtless because there remained in it a greater amount of carbon united with its mucilage. Here perhaps the unsuitableness of habit is felt in a change; because it was right to keep the wine ten days in the vat, when the *menu* containing a great deal of sugar predominated in the vineyards, it is thought proper still to give the same time when other varieties which produce grapes less sweet and weak wines have been substituted for the *menu*.

Some wine-makers, however, take their wine from the vat before the tumultuous fermentation is entirely over, and they applaud the practice; as their proceeding is rational I can easily credit their success.

The fermentation is often facilitated by pouring into the vat a certain quantity of *must* boiling hot; but this good method is proscribed by the prejudices of certain makers who consider wine thus made as adulterated.

During the fermentation a naked man enters once a day into the vat, and returns towards the bottom the stems and woody fibres of the clusters *(rafle)* which the fermentation has raised to the surface: he crushes, besides, the grapes when they have not been trampled in the *cage*. This operation becomes dangerous if the vat is only half full. The danger and the accidents are increased by the intoxication of the persons who are exposed to them: in 1831, an imprudent vine-dresser perished in a vat, in a state of asphyxia.

The temperature in the vat rises in the course of the fermentation to 25° or 26°, (centigrade,) that of the store-house being 15° or 16°.

When the fermentation is over, the wine is drawn off through a hole, made for that purpose at the bottom of the vat, and kept free from the obstruction of the *marc* by tiles, vine-branches, or other articles. On some estates the cellar is under the store-house, and the wine flows of itself, conducted by tubes, into the casks which have been cleansed and prepared beforehand for its reception.

When the wine has ceased to flow and no more remains in the vat the *marc* is taken out and subjected to the action of the press, an enormous square beam of oak fixed as a lever of the second order, on which the power is applied by means of a screw, of which it becomes the nut, and which three men turn by the help of three other levers: this screw tends to press together the thick and heavy plank of the table on which the *marc* is placed.

This wine is put away separately, or mixed with the first to give it a deeper color.

Wishing to have the means of increasing this depth of color, some proprietors cultivate the variety called *teinturier* the whole merit of which is to produce a wine as black as ink.

The great value attached to the coloring of the wine proceeds doubtless from the preference given by *the trade* to that which is highest colored, and this preference is itself founded in part perhaps on the capability of the high colored wines to receive, without its appearing, at least, to the eye, a certain quantity of water.

Yet, is it really indifferent whether the wine contain much of the coloring principle or be almost deprived of it? On this question it may be observed, that wine as it acquires age, loses its color and improves in quality, and besides, that many poor wines are very high colored, but that would not prove that it is useless to wine to have color at first: to determine this question it is proper to collect all the facts, reserving the endeavor to ascertain the cause of them afterwards. Wines deprived of this principle, when first made, easily become thick or acid, and the more certainly the more completely they are deprived of it. When wine becomes thick it loses its alcohol and acquires oil: it becomes acid only by contact with the air. It ceases to be liable to turn acid when it is deprived of that mucilage, which some chemists have called *extractive*, considering it as a distinct substance: by this mucilage also wine is capable of becoming thick; the most mucilaginous wines are the most subject to this fault.

The more coloring principle there is in the grapes, the more tartar also is there in the wine. The mucilage, the tartar, and the coloring principle are precipitated together, and form the lees. The mucilage is not precipitated in white wines, at least it is not precipitated either so promptly or so abundantly as in red wines; yet in the first as well as in the last, the tartar is precipitated, whence it may be concluded that the mucilage is precipitated by the coloring principle. In separating from the lees, the wine does not lose its alcohol, and becomes less and less capable of turning thick or acid.

These facts prove that the coloring principle is useful to the preservation of the wine so long as the mucilage is not precipitated; they enable us, besides, if I am not mistaken, to understand more easily, some phenomena which are displayed in the wine, which depend in some measure upon this principle, and which explain, at least, in what manner the color may contribute to the preservation of the wine.

When, in the spring, the mucilage undergoes a new fermentation, the carbonated hydrogen which is disengaged decomposes a part of the alcohol, and is combined with its constituents in the proportions requisite to make oil; the whole quantity of alcohol is diminished, the mucilage puts on an oily appearance, and the wine has become thick. The coloring principle, which is itself without action on the alcohol, becomes nevertheless an obstacle to its decomposition, by fixing, in the mucilage, to which it is capable of being united, and which can even dissolve it, the tartar which accompanies it, and which tending, as well as sugar, to form alcohol, ought to prevent its decomposition. By being precipitated to the bottom of the casks, carried down by the coloring principle and the tartar, the mucilage ceases to be in contact with the air: it has scarcely any fermentation, and the acidification of the wine is more difficult. I submit to the judgement of chemists this theory, incomplete without doubt, false perhaps, and which I offer only with very great and very well founded diffidence.

When no more wine can be produced by the action of the press, a colored liquid is obtained by watering the *marc* and pressing it again: this makes the *piquette* which is the ordinary drink of the wine-dressers when they are not supplied by the proprietor.

Every year at the commencement of the spring, prudent proprietors rack their wine after having fumigated the casks destined to receive it by burning a match made of cloth dipped in sulphur, four *centimetres* wide by two in length, for each *pipe* in quantity. The cask in which the match has been burned is left shut close for five days; sometimes aromatic substances are added to the sulphur which forms the match, whence results a perfumed flavor, an artificial *bouquet* which is not equally agreeable to all amateurs. Fining the wine with the whites of eggs is practised by only a small number of economical and careful proprietors.

The wine of Marcillac, it is said, cannot bear transportation and keep long; this is a mistake. I have drank it at Paris very good, and four or five years old, coming from the hill of *Gradels*. The wine of the hill of *Cruou*, when made with selection and care, can keep for twenty years, the ordinary term of the ancient Falernian. On this same hill a wine is obtained worth from two to three hundred francs the hectolitre. But an old custom decides peremptorily one of these questions. In the years when the best wine was made, the inhabitants of the place who were in the most easy circumstances, formerly filled a cask with it, from which, after four or five years, they drew successively what they required for their consumption, and replaced it afterwards with new wine: this cask became thus inexhaustible, and was called the *tonneau perpétuel*. Would this custom have existed if the wine would not keep?

If however the wine of Marcillac has lost in general, something of its old quality, it is, doubtless, because the cultivators have given up, as not sufficiently productive, the plants with grapes containing much saccharine matter, but small and few, to substitute for them vines with grapes less sweet, but large and numerous; and besides because they neglect the means to prevent the wine from becoming thick or acid, such as racking, [*mutage*,] fining, and when necessary the addition of a little sugar or boiled *must*, when the weather has been rainy before or during the vintage, and when the wine is weak.

From the various qualities of its soil, and the different temperatures of its climate, from the activity of its inhabitants, from its proximity to lands cultivated in grain, and the facility of obtaining from them the dung of sheep, preferable in all respects, to the manure from half rotted dunghills, mouldy and sometimes of an infectious smell, the canton of Marcillac is capable of producing various qualities of very good wine, the best of which would yield in nothing to the finest wines of France. That the art of wine-making may reach this high degree of perfection, only three things are required, instruction, inclination and capital. Are we advancing towards a future which permits us to hope that they will at last be found united? I dare not on this question affirm any thing, except that this future will be realized only inasmuch as there shall be great profits in attending to the quality, and as this attention shall be excited by powerful examples; or in other words, it will not be realized till the contrary of what now exists shall happen.

Among the obstacles to perfection in wine-making may be reckoned, the temperature of the cellars, most of which, like the vineyards, have a southern aspect; the retail trade, which leaves the wine of the casks which have been broached, exposed for a long time to the contact of the air; the terrible prejudice that all wine managed by a new process is an adulterated wine, which will produce deleterious effects on health, and which should consequently be distrusted, however agreeable may be its taste; the substitutions by which the carriers, to the prejudice of the quality, know how to render their unfaithfulness undiscoverable by measure; a fraud of old date which became in 1550 the object of a severe sentence by which it has not been abolished.

The wine of Marcillac, the trade in which scarcely extends beyond the limits of the department of Aveyron, will soon be indebted for a great market to the immense and magnificent establishment of Decaze-Ville, situated in a canton contiguous to that of Marcillac, and near which will be soon collected a people of smiths: to these, often thirsty, this wine will appear much more agreeable and more wholesome than the fiery wines of Languedoc. It is thus that great enterprises give life to the countries that become the theatres of them: honor to those who undertake them with all the means which presage their success.

FOUR-FIELD FALLOW SYSTEM, AS OPPOSED TO THE THREE-FIELD ROTATION,

Being a Cursory Review of an article No. 9, Far. Reg. (Vol. I.,) under the signature of Wm. H. Roy, Esq. in support of the latter.

To the Editor of the Farmers' Register.

> I sing the tillage old Virginia knows,
> Which cheats with hope the husbandman who sows;
> Not such as Maro sung in deathless strains,
> To piping shepherds and Italian swains.
> With "crops *immense*" no "barn here ever cracks,"
> The wheat comes always badly from the stacks,
> The corn falls ever "most immensely" short
> Of vague conjecture, or of false report.
> * * * * * * * * * *
> Myself a farmer of that sort i'fegs,
> Who rip the goose to get the golden eggs.
> * * * * * * * * * *
> Who rear no clover on a thirsty soil,
> For why?—it grows not to reward their toil:
> Who strew no gypsum, but absurdly rail,
> And swear 'tis nothing to the old cowtail.
> These are their follies—these their crying sins,
> Despite the pamphlet of the enthusiast Binns;
> I own the charge and cry myself, peccavi:
> I read, but follow not, Sir Humphrey Davy.
>
> *Old Virginia Georgics.*

In reviewing the causes which have operated to retard the agricultural advancement of Lower Virginia, it has long been the settled conviction of my own mind, that the most extensive and fatal, if not that of paramount importance to all others, was to be found in the *odious* three-field system. It is still a question of doubtful solution, to which of the two principles mankind have alternately yielded the most absolute dominion; that of the sanctity of time, and custom, on the one hand—or, of an inordinate spirit of innovation on the other. While the latter is decidedly the master spirit of the age, and has extended its influence to all other classes of the community—even that of the agricultural—the former still retains and exercises its ancient and uncontrolled supremacy. In no department of the arts, or indeed of the sciences, (for to that distinction may agriculture now confidently aspire,) have greater improvements been effected than in the theory, philosophy, and practice of farming. Chemistry has shed a flood of light over the whole subject, illustrating its principles, and establishing its laws, on the sure basis of scientific truths—improvements of acknowledged practical utility are daily made; errors both in principle and practice exposed. But yet by the great mass of our community, they are received with distrust, denounced as innovations, or passed unheeded, as the illusions of the theorist; and they still plod on in the "good old way" to ruin—with the same pertinaceous adherence, and no better reasons, than did the old Dutch settlers of Kinderhook, because forsooth, their fathers had done so before them. To the influence of this principle are we indebted for that system, the defects of which, it is my present purpose to expose. Looking as I have done to the explosion of this, and the adoption of some better system, as the only hope for any extensive, or permanent improvement in our agricultural condition, I had early designed making it the subject of a communication, if for no other purpose than that of inviting others more competent than myself to the task.

In this design however, I happily found myself anticipated, and after the two able, and. to my mind, conclusive articles of Messrs. Selden and Carter, considered the whole ground as completely occupied, and that more, neither could or need be said. Presenting as they did, a plain and unquestionable record of practical results, read, discussed, and admitted, as they generally were, I had anticipated from them, the most happy effects—all things, in fact, seemed to afford the most favorable auguries. Through the joint influence of your Essay and your Register, a spirit of inquiry had been aroused—better hopes had been inspired—the *vis inertiæ*, so long felt, removed, and a new impulse every where given to the work of improvement. In the transforming effects of calcareous manure, an approximation seemed really made to the long sought principles of the alchemist, and in the fond hopes of the farmer, were again amusingly revived the bright visions, and early dreams of that visionary—a new era had indeed arisen—the revolution so important to be effected, seemed at least in progress of successful accomplishment, and the future in bright perspective, broke forth in all the beauty of renovated nature: our worn out fields, and poverty stricken herds, (the too faithful moral portraiture of our condition) had assumed a new aspect, and already teemed with life, luxuriance and comfort. But, alas! this was but the day-dream of a too sanguine imagination! A sad reality, in bitter mockery, every where meets the eye.

Among the advocates of the three-field rotation, I regret to find my friend and neighbor, Wm. H. Roy, Esq., a gentleman whose sound and practical views, on all subjects, and whose success as a farmer, justly entitle his opinions to much weight and deference. I cannot better effect the object of this communication, than by glancing at a few of the arguments urged by him, in the article above referred to.

The first position assumed is, "that ours is not a wheat growing country;" and the inference thence deduced, that Indian corn should be our primary crop. When the major proposition is established, I will admit the minor. But by what process of reasoning does he arrive at this conclusion? By "observation, and the experience of years, which have convinced him, that the wheat crop is precarious, and subject to numerous casualties, which no skill or industry can remedy." Let us not, however, take the fact, without investigating the cause. He proceeds, "it not unfrequently happens in the spring, when the wheat is in bloom and promises an abundant yield, that the hopes of the farmer are blasted by an easterly storm. Indian corn is the only crop on which he can with safety rely." Would it be right then, he asks, "to adopt a system which would render wheat our primary crop?" Would it be right, (if I may be permitted to answer this question by asking another,) to persist in a system, which year after year, but mocks us with disappointment? I do not maintain that ours is a wheat growing country—nor, consequently, that wheat should be made our primary crop. But I do maintain, that the converse has not been established—that our entire system is opposed to its success—that its cultivation should either be abandoned, or that, to the extent cultivated, recourse should be had to some more ameliorating system, and that the very admission of the fact of "uncertainty," is the strongest possible argument in support of this. Nor is the conclusion drawn from our want of success, a legitimate one. By parity of reasoning it might be shown, that James River, and other sections of country, (for there this system has been repeatedly tried, and with no better success,) were not wheat growing regions. Can it then be expected, that a system which has entirely failed in a location naturally adapted, both by soil and climate, to the production of wheat, should not fail in one acknowledged to be defective in both? And does not the fact of its "being uncertain and subject to numerous casualties," give it an additional claim to the fostering care of the most judicious and approved cultivation? But it is "by the easterly storms that the hopes of our farmers are so frequently blasted." Here we join issue—now I do not imagine, that clover fallow is to afford an effectual protection against this evil; but I do suppose, that it would go very far in counteracting its effects. I take it for granted, that whatever contributes most to the health and strength of a plant, contributes at the same time most to the probabilities of its success. No one I suppose would hesitate to admit, that a healthy and vigorous crop is, in the first place, much less liable to disease of any kind, than a feeble half starved one; and that if attacked, it would successfully resist disasters, to which the latter would fall a ready victim. As well might we compare the ability of the nursed up invalid to resist the winter's blast, with that of the hardy nursling of the storm.

"I will concede," says the writer, "that land will improve faster under the four-field system, &c." An important concession, truly—involving, I conceive, the whole matter in controversy. Land constitutes the principal capital, and its improvement I had supposed the principal object of every farmer. To this end are all our efforts directed, and by its subserviency to this purpose, do we pronounce upon the value of every system. Of what importance are a few abundant crops, provided they leave us in return, an impoverished and worn out soil? Let us but make our land rich—adopt that system as the best which most readily effects it, and we may then cultivate as either taste, interest, or pleasure dictates.

"Indian corn," again proceeds our author, "is the only crop on which we can with safety rely. In a country not well adapted to hay, it furnishes us with the means of supporting stock, and of manuring extensively." I admit the justice of the eulogium, and have certainly no disposition to quarrel with our best friend. With us it does indeed constitute the staff of life. It is with the system alone that I am at war; and to that I cannot concede the superiority claimed. That loss in the corn crop will be sustained for a year or two, is probable; but that as soon as in full operation, and the effects of the system are fully felt, that that loss will be more than compensated, and that one-fourth of the same farm, will produce as much as one-third had previously done, there can be but little question. Upon this hypothesis, (and it is one which may be sustained by a reference to the actual results of farms under the two different systems,) no diminution of the corn crop being sustained, it follows of course, that there can be no diminution of material, either for manure, or the support of stock. On the contrary, from the increase, (say the three-fold production of the wheat crop) the material for both purposes is greatly augmented, in the articles of wheat straw, clover hay, pasturage, &c.; and these, together with the increase of product, may be struck, as a fair balance, in favor of the fallow system. It is thus under this system that wheat becomes the primary crop, not by any actual diminution of the corn crop, but by the increased production of the former; and surely to its priority on such terms, none of us can object.

"But," says the writer under consideration, "after all, facts afford the best arguments." "I have noticed with minuteness and attention, the experiments of several of my neighbors, and will give you the results. One divided his farm into four-fields, and cultivated them successively in corn. His land, judging from the growth of vegetable matter, evidently improved—yet, his corn crops declined, and his wheat crops were generally destroyed by insects. He was compelled to return to the three-field system." The instance here referred to, affords a fair specimen, and the results a fair commentary on the four-field system, as pursued among us. I beg leave to state, that it was not the four-field fallow system now in vogue, as known and practised on James River and elsewhere, but that introduced by the late Col. John

Taylor, of Caroline—in other words, a turning out for four years in succession, with a certain prospect at that time, of an abundant crop of pine bushes, broom straw, and of every noxious weed, with which the iniquities of our first parents were visited. "Another gentleman, possessing more enterprise than his neighbors generally, divided his farm into five-fields. His crops of corn and small grain, have retrograded. He has had several crops of wheat on his fallow fields, which promised a most abundant harvest; and yet from insects, or storms, or some other casualties, he has always been disappointed in his expected harvest. This last gentleman possesses all the requisite skill and and industry to insure success. He will, I doubt not, although he is unwilling to admit it, yet return to the despised three-field system." Really I had expected more magnanimity! Such enterprise, skill, and industry, deserved a better fate! But, alas! who can contend against fortune —against the combined powers of insects, storms, and other casualities? He has, in truth, returned to that despised system. "Another neighbor has been cultivating his farm in four-fields for several years. His small grain crops increased; but latterly a great change has taken place—his barley crop (his principal reliance) has gradually dwindled away; until this year, he may be said to have sowed himself out of seed—and fairly abandoned the crop." The gentleman here alluded to, deserves to be particularly mentioned, as the first who had the boldness to set up for himself, and introduce the new system among us. His success for several years was signal—so much so, as to attract the attention of all, and to induce a few others, partially and cautiously, to follow his example. The production of his farm under this system, I have no hesitation in saying, has been double that under the former system, and greater by far than that of any other farm of the same size and equal fertility. I allude to the grain crop; nor am I aware, nor do I believe, that any diminution has been sustained in the corn crop. A series of disasters, it is true, he has shared in common with others—Mr. R., himself, not excepted—but under all circumstances, his crops have been better than any in the neighborhood.* "I will cite you another case—a farmer very near me, a particular friend, &c., divided his farm into four fields. He has made great exertions to improve it by manure, rest, &c., and his success is very flattering, &c.—yet, I think, he is nearly convinced that the four-field fallow system will not answer, and that he will speedily abandon it. His small grain crops have never come up to their promise, and the wild onion is gaining rapidly on him."

For that gentleman, I take it upon myself to say, that although his crops have not been adequate to his expectations, yet, that his confidence is undiminished, and his perseverance unsubdued. To the onion he pleads guilty. True it is, that at various times, in consequence of not grazing, it has taken almost entire possession; but yet, after a doubtful and protracted conflict, his crops, both of wheat and barley, (through the redeeming virtue of fallow) have invariably obtained the mastery. The wild onion, I will here take occasion to add, has almost entirely given way; and to perseverance in the system, he confidently looks for its entire eradication. I will add, that while clover constitutes the chief excellency, and an indispensable part of the fallow system, yet, that in none of the instances above referred to, was recourse had to it, and that success ought rather to have been a matter of surprise, than of reasonable expectation.

In concluding this hasty review, I cannot but advert to the silence, and becoming modesty, with which he passes by the success of his own experiments. I submit it to his own candor to say, if in the several instances in which he has tried fallow, he has not more than doubled, if not trebled, the production of the same land, wheat succeeding corn. In the last instance, on a lot of several acres, a crop of 25 bushels per acre was produced. Now, if one or more acres, under a certain system, be capable of producing a certain crop—why may not a greater number under the same system, and similar circumstances, produce a similar crop? On the ordinary principles of induction, may I not then conclude, that the same system *in extenso* would be attended with the same results; and (reasoning *a priori*) derive an additional argument in support of the position assumed —that want of success is not so much attributable to soil, or climate, as defect of system.

I cannot in stronger terms express my unqualified condemnation of the three-shift rotation, than by adopting the words of that distinguished agriculturalist, Col. Taylor of Caroline. "As a system," says he, "for extorting crops from the earth, it is precisely similar to the rack for extorting truth from the sufferer. It stretches, tortures, mangles, obtains but little of its object, and half, or quite kills its victim. This three-shift system has only one merit—honesty. In theory, it promises to kill our land; in practice, it fulfils its promise." With him I cannot accord to it, even the merit of honesty. It professes, in fact, to improve, and under the imposing guise of friendship, inflicts the deadly wound.

A chief objection to the system, consists in its hostility to the cultivation of grass; and a capital defect growing out of it, among our farmers, is that of an entire reliance on artificial putrescent manure, to the neglect of the more important auxiliaries, of green succulent vegetable crops. Among these, red clover claims a decided pre-eminence. Yet, strange to tell, while in other sections it has been regarded as the most important, if not the only real efficient agent; with us it has been entirely neglected; at least with reference to the improvement of land. I know of nothing which would be regarded with more incredulity, than the assertion that a good crop of clover was equal to a plentiful dressing of stable manure—yet we have the authority of Messrs. Carter, Selden and others, for the fact.

An unfortunate impression prevails, that our lands are not adapted to clover. I do not assert that they possess that peculiar aptitude for it, which characterizes the James River and mountain country; but that it can be cultivated to great advantage even on our worst soils, improved to a

*This statement, however contradictory, is not designed to impugn the correctness of that of my friend R. It is given as a mere matter of opinion, on a subject of fair difference, and in the absence of any certain data.

certain degree, (and with us such improvement is always pre-supposed) admits of but little question.

The greatest obstacle with which we have to contend, arises, I have long thought, from the fact, that from the neglect of the cultivated grasses, our lands have become so completely pre-occupied by noxious weeds and other grasses, as to afford in the contest for possession, a very undue advantage to these, the primitive and rightful tenants.

The efficacy of plaster, in consequence of our contiguity to the sea, and the supposed neutralizing effects of saline atmosphere, has also been much questioned. So far as experiments have been made, their results have been so equivocal and unsatisfactory, as to leave the subject still entirely problematical. The use and value of ashes, calcareous manure, &c., in counteracting this effect, (as suggested by yourself and others,) is a subject of interesting inquiry, well worthy the attention both of the practical and scientific agriculturalist.

But, say the advocates of the opposite system, what obstacle is there to the cultivation of clover under the three-field rotation, with the addition of a standing pasture? To this I will simply object, that it is a begging of the question—that it constitutes no part of the system—that clover is principally valuable as a fallow crop for wheat—that corn requires a clean preparation, and (as generally admitted,) seldom succeeds on a clover lay. It is in the application of manure, that the beauty of the system is particularly seen. Manure is to the farmer, what principal is to the money lender. The value of both depend upon the activity with which it is employed, and the return annually made. If it is a sound principle with the one, to collect punctually every year his interest and add it to his principal, it must be a bad one for the other to await a precarious return but once in three years. There is nothing so discouraging to a farmer, as to find at the expiration of that time, all his labor lost, (as is the case in most of our soils,) and nothing but an increased necessity for renewed exertion. If his manure is to be evaporated and lost, why not derive the benefit of it to a crop. Here the clover crop interposes its kind offices. By this it is taken up, secured from loss, held in trust for the benefit of the land, and in the admirable economy of nature, returned in a new and modified form to the purposes of its own support.

The value of clover admitted, and the practicability of its cultivation established, the superiority of the four-field fallow system must be conceded—three-fourths of your land being in active production, and the remaining portion under a course of regular and progressive improvement. The limits assigned to an article like this, (and which I have already greatly transcended,) forbid me farther to enlarge on the many other advantages which might here be mentioned. Facts, however, "after all afford the strongest arguments." Compare then those sections in which the two systems have been respectively pursued—point out the individual instances of success under each—show me the estate under the three-field system, which, either in its profits, or the rapidity of its improvement, can compare with that of Woodstock, Westover, Shirly—raised as if by the magic of a system, from the ruin and desolation to which they were reduced, by the scourging effects of an opposite course. We have among us intelligence, energy, and enterprise—no where are the evidences of these more obvious—neatness, order, good cultivation, and general good management are striking features—and challenge from every observer a proud contrast, with that of most other sections of country. But yet our lands, with few exceptions, are scarcely stationary—our citizens, worn down with toil, and disappointed in their expectations, are seeking in the "far west," the land of hope and promise, and leaving to ruin and abandonment, the neglected fields and deserted homes of their fathers. Let others seek in the romance of their feelings, the wildness, vigor, and untamed luxuriance of the west. Give me, (and would that I could inspire others with the same hallowed feeling,) give me, the endearments of early life, the social enjoyments, and solid comforts of the old states, pressing rapidly onward as they are, in their career of improvement, and destined as they soon must be, to rival even the old world, in all the improvements and refined elegancies of life.

W. T. T.

Gloucester County, April, 1835.

FREDERICK AND JEFFERSON COUNTIES—REMARKS ON THE CHARACTER OF THE COUNTRY, AND THE SYSTEM OF CULTIVATION.

To the Editor of the Farmers' Register.

Most of the readers of the Farmers' Register have heard much, and few comparatively have seen any thing of the Valley of Virginia, that par of it especially which borders upon the Shenandoah and the Potomac rivers. Some remarks upon the character of the country, the system of cultivation, &c. may not be unacceptable to the public. No part of Virginia has been improved to so great an extent, and with so great rapidity, as the region of country which I have mentioned.

The best portion of the county of Frederick lies to the east of the Opequon and borders upon the Shenandoah river; it joins the beautiful county of Jefferson, which through its whole extent, has the same river as its eastern border, and the Potomac river as its northern limit. The same vein of land runs through the upper and better portion of the state of Maryland, and through Pennsylvania to Philadelphia, embracing in its course, the justly celebrated counties of Cumberland, Lancaster, York, and many others. My remarks are intended to apply to the part of the county of Frederick above mentioned, and to the county of Jefferson, because with them I am familiar. The extraordinary point of improvement, fertility, and value to which the Pennsylvania portion of the valley has attained, has been produced by the absence of slavery, and the consequent division and subdivision of the land into farms of from ten to one hundred acres. Of course we can enter neither into comparison nor competition with them in the absence of the cause of improvement to which I have referred. I believe however, that the portion of Virginia alluded to, is in no respect inferior, in natural fertility, to any part of Pennsylvania.

Our lands are very much broken with ledges of limestone rock, causing great labor and expense in their cultivation—though this inconvenience is very unequally felt in different places, diminishing generally as we approach the rivers. The country is for the most part abundantly supplied with limestone streams—though we have reason to fear that this great advantage is lessening every year from summer droughts. Certain it is that both the springs and streams flowing from them are much less copious than they have been within the recollection of many living witnesses. In fact, the great enemy with which we have to contend is drought. Our lands burn easily from the great quantity of limestone at and near the surface, and hence our cropping is precarious, except upon well improved lands. With all of these disadvantages, (and I may add to them a harsh and most capricious climate) agriculture is in a prosperous condition, and the price of lands immensely high. It will be recollected that about the year 1817 lands had attained a price totally disproportioned to their productive value—from sixty to eighty dollars per acre being the current rate. The reaction, which afterwards followed, reduced them as much below as they had been above their real value. One of the best farms in Jefferson county sold under my own observation, for twenty dollars per acre. It has now settled down at a mean between the two extremes, and the present value of good land may be fairly stated at from thirty to forty dollars.

Clover and plaster of Paris are here, as elsewhere, the instruments of improvement. Soon after the introduction of plaster among us, our most energetic farmers used it with great effect; and judging that the benefit would be proportioned to the quantity used, it was laid on with a lavish hand. Hence it resulted that the land became, as it was termed, "plaster sick," and no continuing benefit seeming to follow, it was in a great measure abandoned. The circumstance was eagerly seized upon by those averse to the expenditure of money upon their lands, to justify their neglect of its use altogether. As soon however, as the effects of its former use had worn off from the lands which had been benefited by it, it was discovered that the clover ceased to grow luxuriantly, and of consequence that there was an end of improvement, most sensibly felt in diminished productiveness. It was therefore again brought into free use, and is now in as high favor as ever, with a much better understanding of its properties. No farmer now thinks of using clover without plaster, it being a concession, that it is entirely dependent upon this valuable auxiliary for its efficacy.

Manuring is also extended as far as practicable by every one—though the manner of applying it is various. Many persons feed their stock through the winter upon the hills and galled spots in the open fields. Others pen them near the straw-ricks, and leave the manure to be afterwards hauled upon the field where it may be wanted; while others (more particularly small farmers) adopt the old system of bringing every thing to the barnyard. No attention is paid to mixing manures for compost: that which is in order is usually put upon the corn land in the spring, while the rough or only partly rotted is reserved for fallow in the autumn. The old practice of ploughing in the manure generally prevails, though many of us have been induced by what we have read in the Farmers' Register, and elsewhere, to try the top-dressing, and I think the latter plan is growing into favor. While I do not question its adaptation to the porous and sandy soils of the lower country, I have apprehended great loss from evaporation in our stiff, unyielding lands. It is a question of great importance, and it is hoped that continued discussion and experiment may lead to some satisfactory solution.

Our staples are, as you know, wheat and corn; rye and oats are made for home consumption. The market for corn has been confined to the neighborhood sales, from its not bearing the cost of distant transportation. Indeed, no effort is made to produce it beyond the point of home consumption, and the necessity of freeing the land from blue-grass. Wheat is our only article of export, and every thing is made to yield to its culture.

Here, as in almost every other part of Virginia, the land has been reduced by close grazing. We are, however, fast awaking to the impolicy of this course. Even those who have been in the habit of purchasing cattle for future sale, (the only profitable grazing,) are giving it up. We have no standing pastures, being dependent upon the cropping fields for pasture. Add to this, we have discovered at last, that our corn-stalks and straw will yield more manure when wastefully given to a few cattle, than when altogether consumed by many.

I do not think that a particular rotation of crops is much observed among us. We cultivate in corn those fields which are too grassy to promise a crop of wheat without cleaning, and generally fallow in alternate years those which will answer for wheat, as long as their condition will permit. I will here remark, that we understand the term "fallow" to mean exclusively those lands which have laid out of cultivation for a year or more, whether naked or in clover, and which are broken up for wheat in the summer and autumn. I think the term has been frequently used by your correspondents in a different sense. Corn field wheat, except when highly manured, very rarely yields a tolerable crop. Hence, a practice is fast obtaining—more especially in Jefferson—of leaving the corn land over for fallow the succeeding year. However adverse to sound theory it may seem, to leave land thus naked, certain it is, that in practice it answers remarkably well; and I believe that it will be within a few years very commonly adopted. I understand that this practice is very general in Frederick and Washington counties, in Maryland, where the lands are admirably farmed. Our proper rotation will then be as follows: 1st. Corn. 2d. Rest. 3d. Wheat; followed by clover. 4th. Rest in clover. 5th. Wheat—growing a crop of corn and two of wheat fallow within five years. When a good crop of clover has been turned under for wheat, many of our best farmers venture to stubble for a second crop.

An interesting experiment has been tried upon corn land; just after the last ploughing, clover-seed has been sowed, and the result would have been highly satisfactory but for the summer drought, which we rarely escape.

Corn land is also very often left over for oats and clover in the spring, and has always produced better than other oat land. The clover sown upon the fresh land immediately after the oats are harrowed in, will very generally succeed much better than when put in the usual way upon the wheat lands.

The heavy expense attending the carriage of our products to market has been heretofore a great drawback upon the prosperity of the valley, and nothing except flour has been available at all. A better day has now dawned upon us. The Chesapeake and Ohio Canal, and the Baltimore and Ohio Rail Road, both now in full and successful operation to Harper's Ferry, give us an outlet at that point, and have already reduced the expense in a very great degree. Within another year the completion of the Winchester and Potomac Rail Road to a junction with those great works, will leave us nothing to desire as to transportation, and must very materially enhance the value of our lands.

Our prospects for the present year have been marred by the unusual severity of the past winter. The cold and dry autumn prevented the vegetation of the wheat in due time. It came up under the snow in January, and began to promise fairly, but the subsequent intensity of the cold appears to have destroyed it in its tender state; and now it is very certain that the crop will be a very short one.

The foregoing remarks are designed to describe things as they are in this part of Virginia, and although devoid of any particular novelty, may not be without interest to those who desire information.

A FREDERICK FARMER.

From Dr. Lardner's Second Lecture on Steam, Delivered before the Liverpool Mechanics' Institution.

NEW MOVING POWERS, AND IMPROVEMENTS ON THE USE OF STEAM.

The celebrated Leslie has invented a method of producing ice, by the employment of sulphuric acid. This acid has such a strong affinity for water, that if it is present in an atmosphere filled with vapor, it will immediately seize upon the vapor and incorporate it with itself. He places water in a watch-glass under an air-pump, with sulphuric acid near it: the air being withdrawn from the pump, the sulphuric acid seizes upon the vapor as it rises from the water, and the water parting with all its heat to maintain the vapor, is converted into ice. In performing this experiment, it is necessary that the vessel containing the sulphuric acid should not be in contact with the water, otherwise the degree of heat which accompanies the combination of the vapor and the sulphuric acid would prevent congelation taking place.

A very pretty experiment, to prove that the atmospheric pressure is a great agent in preventing water from boiling, can be performed with a flask half filled with boiling water, and closed at the neck. If it is in that state plunged into cold water, it will boil; but the ebullition will cease when plunged into boiling water. This is because the cold water condenses the steam in the upper part of the flask, and, by removing the pressure, allows the water to boil; whilst the hot water keeps up the temperature of the steam which presses on the surface of the water so as to prevent it boiling.

From these investigations it may be concluded, that a liquid or gaseous state is not essential to the nature of any substance, but that its state is entirely dependent on the supply of heat which that substance has access to. We know that water can be passed through these three states, by the abstraction or the application of heat. Fluid mercury may be evaporated, and the fact ascertained by passing the vapor through a cold tube, and it will again assume a liquid state; it may also be made solid, so as to take a shape like a metal. The most refractory substances we know of are capable of being converted into liquids by heat. All the metals we know of may be brought into a state of fusion by a proper supply of heat; indeed, all substances, by proper treatment, may be seen in the solid, fluid, and aeriform state. By turning the rays of the sun, through a lens, upon gold and pantinum, we can decompose them, and convert them into gas. There is only one solid which has not yielded to fusion, and that is carbon, or the diamond; but we can only conceive that we cannot reduce it, because we cannot command a sufficient quantity of heat to melt it and maintain it in a liquid state. Of all liquid there is only one which has not been congealed by the abstraction of heat, and that is alcohol, or spirits of wine.

We can only argue by analogy, that the bodies which exist in the gaseous state can be reduced to liquids or solids: which leads us to suppose that the substances known as atmospheric air, oxygen, hydrogen, &c. are, in fact nothing but the steam of various substances which cannot exist in the liquid state upon the surface of our globe without being deprived of a large portion of heat. This analogy has been confirmed by recent experiments and discoveries, particularly by those of our distinguished countryman Farrady. Neither steam nor any gas can be reduced to a liquid by compression alone, however high the degree of compression applied to it, notwithstanding the assertions of superficial writers, and even of some who are otherwise well informed, on the subject. But if, by the compression we could squeeze out the heat from these gaseous bodies, we could then liquify them. Dr. Farrady has substantiated this by actually converting several gases into liquids. For instance: he found, that when carbonic acid gas was submitted to a pressure of 1000 lbs. on the square inch, it became a liquid. It must, however, be remarked, that as the pressure is increased, the temperature is raised; and it is not until the gas is cooled that liquid is produced. These facts, united with the other analogy, afford such a high degree of probability, that, to a reflecting mind, there can be no doubt that every substance, in parting with its heat to a certain extent, becomes a solid; and it is possible to conceive that if, by any circumstances, the temperature of our globe were raised sufficiently, the water of the ocean would no longer be able to exist in a liquid form, but would assume the state of vapor, and mix with the atmospheric air. By the same cause, many of the solids would be converted into liquids, and fill the body of the ocean, so that we should have an atmosphere of steam, and an ocean of metal—a gold and a silver sea. Then, again by the process of evaporation, which causes liquids to pass into vapors, we should see the fable of Jupiter descending in a golden shower illustrated in golden and silvery showers. To carry the analogy still further; we know that water cannot exist in a liquid state at the poles. A slight decrease in the temperature of the globe, on a change of distance of the sun, would cause all the water of the earth to become solid; a further decrease would freeze the various gases, so that the air would drop down, and form an ocean of water; and a still further reduction of temperature would convert it into a solid body.

These circumstances suggest to a reflecting mind the beautiful adaptation of the different objects on the globe to each other, and the distance of the earth from the sun. Otherwise, those substances which ought to be liquid, for the sustenance of animals, would subsist in the solid state. It is not at all improbable, that the different planets have different substances in them, suitable to their distances from the sun; for there is no doubt that the temperature is produced by the sun, and depends on the sun's distance from the planets, and its intensity is diminished in proportion to its distance. In the planet Jupiter, the heat is twenty-five times less than it is with us; and water, on such a globe, could not exist in a liquid state, unless heat was supplied from other causes than the sun.

When we consider the prodigious mechanical power which has been obtained, by the mere ability, on our part, to convert a liquid or water into steam, and reconvert that steam, into water; when we consider the enormous amount of human civilization which has been produced by the due application of this simple physical effect; when we consider, that it is probable that the relations of the human race may be altered and modified by this application, and the very distances of the different parts of the world be changed by a speedy intercourse, and the prices of the objects of consumption be ultimately affected by it; when all these effects are attained by the mere fact of our availing ourselves of the simple physical effect of converting water into vapor and back again, we naturally say, where there is so large a field, and so many different substances from which the effect may be produced, should we not expect, from the large advances which are making in the generalization of these principles, that this effect may be produced from other substances. Water possesses several properties which render it the most hopeless and unfit for such an experiment. In order to convert it into vapor, we, of course apply heat. The least promising liquid is that which requires the largest application of heat; and, of all liquids, water consumes the largest quantity of heat, requiring 1000 degrees to raise it from a boiling state to a state of vapor: therefore, *a priori*, a philosopher would say, try spirits of wine, or a thousand other things, but do not try water, for this special reason. It may be said, that the cost and difficulty of producing any species of vapor does not depend upon the fuel necessary to produce it, but on the cost of the liquid itself. Supposing, then, we could get fuel for nothing, still water is the most unfit and unpromising agent. For instance: in the transport at sea, the source of heat is derived from coals, which are bulky, and are transported in the vessels in order to produce steam; the water at sea costs nothing: and, suppose the fuel cost nothing, still they must be carried, and they impose a limit to the application of the steam engine to the purposes of navigation. A vessel impelled by steam-power of 200 horses consumes one ton of coals per hour, or twenty-five tons per day: therefore, to provide for a voyage of twelve days, it would have to carry with it twelve times twenty-five tons of coal. Thus, therefore, there is a limit to the application of steam navigation. It is generally understood, that a vessel cannot carry more fuel than is necessary for the purpose of propelling it ten or eleven days; consequently, by the present steam impelling power, such a voyage as from Liverpool to New York could not be made for any practical and advantageous purposes.

In considering the prospects of improvement in these respects, we naturally look towards those liquids which are most readily turned into gaseous form. Ether and alcohol are easily converted into vapor, but in the way in which the steam power has been applied these liquids are rather expensive. If it was used in a high pressure engine the vapor would escape into the air and be lost, whilst, in a condensing engine, although not lost, it would be mixed with so much water that its separation would be attended with a considerable expense. There is only one other way in which it is possible to use alcohol, namely, by condensation, in contact with a cold surface. If we introduce the vapor of spirits of wine into a thin shell, formed by two bodies placed upon one another, after working the engine, it will spread over the cold surface of the hollow shell, the steam will be reconverted into a liquid state, and trickle out at the bottom, so as to be warmed over again, and this might be carried on from time to time.

But this great step must be followed by another improvement in the steam engine, especially for the purposes of transport both by land and by water, which will doubtless be cultivated in our own time. It is the application of the gases, and especially of carbonic acid gas. in a liquid form. If we could obtain carbonic acid in sufficient quantity, and on sufficiently moderate terms, there is no reason why it should not be employed to supercede steam at the present time. This gas takes the liquid form at the common temperature, under a pressure of 1000 pounds, and in that state exerts a prodigious power, and from its small bulk, would effect a saving of tonnage. The difficulty to its adoption lies in the price of the liquid, the providing of proper air-tight valves and pistons, and in guarding against the corrosion which the carbonic acid would cause in the materials themselves. But all these are matters of detail, and are at present but temporarily difficult, and we may, therefore, look forward to the superceding of coals altogether in the steam engine, by the use of the liquid carbonic acid, as nothing would be necessary except to send it into the receiver, and let the piston of the engine work as with steam; possibly it might be found expedient to apply heat, but a trifling degree only could be applied, as the power of the gas is so great that it has no bounds. Thus we should get rid of the magnitude of the marine boiler, and a thousand other inconveniences which attend it. We may, therefore look forward to the time when we may send our captains to sea with the wind that is to blow them in their waistcoat pocket; and it is not impossible, that we may get rid of those ugly smoky chimneys! which are at once so unpoetical and unpicturesque, and against which our sailors so bitterly complain, because they deface the surface of our beautiful sea.

OPERATION OF THE FENCE LAW ON THE POOR.

To the Editor of the Farmers' Register.

Brunswick, May 1st, 1835.

Although my experience or success will perhaps not justify any attempt by me to enlighten our people on the subject of agriculture, I am still induced to hope from every day observation, that I may say something which will be of service to some one individual, who might be more active, and exert more influence in behalf of our own old Virginia.

Mr. Editor, it is not enough for me, to hear that a man is a patriot—he must be a *Virginia* patriot. Have we not great reason to doubt the patriotism of our political editors, when we see room, and to spare, in their papers, (if we are to judge from the trash which they sometimes present to us,) and not one single extract from your invaluable paper? Are they afraid of infringing upon your rights, or do they believe that your paper, (as good as all of them acknowledge it to be) is taken by all of our citizens? Or are they so absorbed in the subject of politics, as not to see that it would benefit rather than injure your paper? Or are they indeed enemies to the formerly sturdy and honest, but now withering and disreputable agriculture of this good old commonwealth? I would not charge them with want of patriotism, or with being enemies to the cause of agriculture; but I would charge them with a heedless forgetfulness of the best interest of our people.

There is an old proverb frequently used to prevent poor people from marrying, that "when poverty comes in at the door, love will jump out at the window," which although not always true, is somewhat applicable to patriotism. When poverty comes in, patriotism, I was going to say, would take its departure, but at all events I will say, we see daily the hardy yeomanry of our state, when they begin to feel the secret but chilling blight of penury creeping in upon them, after a long and desperate struggle between patriotism, and the want of bread, yielding to the imperious requirements of the first law of nature, and with almost bursting hearts, bidding farewell to the land of their nativity to seek a home in a more plentiful country.

But sir what is the remedy for this state of things? You will say, improve our lands and the people will not move. But how are we to improve our lands? In many ways, which our people will not listen to, but which they might be induced to attend to if proper means were used. Cannot the press throughout the state be enlisted, to encourage agricultural societies—to call upon enlightened practical farmers, when they are *electioneering*, if at no other time, to give their more uninformed neighbors some new notions on farming, and whilst they enlist their feelings in favor of the candidate of their choice, enlist them also on the side of agriculture—which is to injure no party, but enable them to enjoy more perfectly the blessings of civil liberty in their native land. Mr. Editor, I differ from you, if you think your paper alone sufficient to bring about an entire reformation in a short time.* There are a great many of our good citizens who take political and other papers who do not take yours, but who might be induced to read communications in your paper upon the recommendation of their favorite political editor. But there is one subject particularly on which we need the aid of the press generally and that is the present fence law. We would not ask them to join us, but only to call upon the people to examine the subject fully and impartially, but particularly that the poor would look into it—for lately it has been objected that the poor would be oppressed by the alteration. And when I took my seat to write it was mainly to say something on the subject of the fence law, as oppressive to the poor. And although you may be tired of my stuff, I will try and give you some of my notions on that subject.

I take it for granted that the richer class of the community ought generally, as they have the means, to be the most enlightened; and if so, they will very readily see the propriety of uniting in support of the proposed alteration: unless indeed they, or some of them, see the benefit which the poor would derive from it, and be unwilling that they should receive and enjoy that benefit. I have the charity to believe that there are very few, if any of that sort. But that it would not oppress the poor, I shall try to give a few amongst a great many reasons. I will start with this self-evident proposition, that it requires half as much fencing to enclose a square of one hundred acres of land that it requires to enclose a square of four hundred. The richer man has a tract of land of eight hundred acres, half of which, is arable land; the poorer man has a tract of two hundred acres with the proportionate quantity of one hundred acres of arable land. The richer man has twenty hands on his farm, the poorer the proportionate number of five. The poorer man, (I use the comparative degree as one would not be considered very rich or the other very poor,) has to perform annually with one-fourth the hands half the labor in fencing that his richer neighbor does: and the richer man has to cut annually twenty acres of his wood land for the purpose of fencing with his twenty hands whilst the poorer has to cut, not

* Most assuredly we hold no such opinion—and none could be more absurd, at least while our subscribers do not amount to a fiftieth part of the farmers, even in Eastern Virginia—and perhaps bear no greater proportion to the number of those who read party politics, and almost nothing else—a kind of reading, which alone, and especially when (as is usual) confined to one side, teaches more falsehood than truth, and results more in ignorance than knowledge. In reply to a previous observation of our correspondent—so far from considering the extracting for republication from this journal, however frequently or copiously, as "infringing on our rights," it would be highly gratifying: and whether beneficial to our private interest or not, it would be greatly aiding whatever the Farmers' Register can do for the service of agriculture. But the true and sufficient reason for extracts being so seldom made by our brother editors, is simply this: their object is to make their papers as agreeable as possible to their readers and patrons—and to the great majority of them, subjects of party politics, and their usual accompaniments and embellishments, are the most pleasing. The censures of our correspondent then should be bestowed on the general taste of readers, even among the agricultural class, and not on the editors who minister to their pleasure, and aim to supply their intellectual demands.—Ed. Far. Reg.

five acres in proportion to his hands, but ten acres, since he has half the fencing to do which the richer one has to perform. But pursue the consequences: the poorer man in half the number of years has been obliged to cut down all his wood land, and the richer one by the same necessary course has only cut down double the quantity which the poorer has cut, and has still a good chance of woods left. And now see the condition of the poorer man compared with his richer neighbor. His neighbor having had less fencing, cutting, mauling, and hauling rails to do, has had more time to improve his land, (which improvement has been much less in consequence of the present law,) has in some sort gotten along in the world, and perhaps has a little money; whilst the other poor man, from the want of timber, is obliged to sell his land. His farm is now in market without a rail tree upon it. Who are the bidders? not his neighbors in moderate circumstances—no, they cannot buy for the same cause that has brought him to want, and because the land has no timber; but his richer neighbor, without an opponent, buys it at his own price, because he can open the wings of his fence and easily enclose so small a piece in a body with a large one; and the poor man is forced to leave all that is near and dear to him, and seek a home in a new country, not more highly favored than originally our beloved Virginia. And there is another view of the matter; the poorer man, from the weakness of his force, and the over proportion of his fencing, is apt to neglect his fence, and his richer neighbor's stock, four times as large as his own, break in upon him when he is perhaps from home, and destroy half his crop in one day—and then the falling out that takes place not only between them, but perhaps half the neighborhood are engaged in this dispute. Do you not perceive by the above named course, that the circumstance of our state being cut up into small tracts of land, has, under the present law, either driven from us the hardy yeomanry of the country, or brought upon many of them such abject poverty, as to render them very useless citizens; and that Virginia has principally been impoverished by the same circumstance, and its consequences. Thus, if the above reflections are sound, we see that the poorer a man is, the more oppressive in proportion is this odious law.

It may be objected that there are some so poor as to own no land at all, and that this rule will not apply to such. But how many poor have we who could rent and would cultivate a piece of land, which they might get for a very small sum, if it were not for the cost and labor of enclosing it; and how much waste land would the poor be allowed to cultivate, merely for the sake of having a small piece of meadow cleaned up for the proprietor, which meadow would yield the tenant an abundant supply of provender for all his stock. But Mr. Editor it is not for me to use such little arguments to trouble you—but our object should be to induce the people to attend to us whilst we give these arguments by word of mouth.

WAQUA.

From Dublin Medical and Chemical Journal.

INTRODUCTION OF FROGS INTO IRELAND.

It is not generally known that the introduction of frogs into Ireland is of comparatively recent date. In the seventeenth number of the Dublin University Magazine, there is a quotation from the writings of Donat, who was himself an Irishman, and Bishop of Fesulæ, near Florence, and who about the year 820, wrote a brief description of Ireland, in which the following passage occurs:—

> "Nulla venena nocent, nec serpens serpit in herba;
> Nec conquesta canit garrula rana lacu."

"At this very hour," says our respected contemporary, "we have neither snakes nor venomous reptiles in this island; and we know, that, for the first time, *frog-spawn* was brought from England in the year 1696, by one of the fellows of Trinity College, Dublin, and placed in a ditch in the University park or pleasure ground, from which these very prolific colonists sent out their croaking detachments through the adjacent country, whose progeny spread from field to field through the whole kingdom. No statue has yet been erected to the memory of the natural philosopher who enriched our island with so very valuable an importation of melodious and beautiful creatures." We may state, however, that we have learned from good authority, that a recent importation of snakes has been made, and that they are at present multiplying rapidly within a few miles of the tomb of St. Patrick.

THE INJURIOUS EFFECTS OF HEAT ON CULTIVATED LAND.

To the Editor of the Farmers' Register.

Fauquier, April 21st, 1835.

In two communications I addressed to you in February last, I stated that *"heat is a great destroyer of the vegetative or nutritious principles of the earth."* So far as I then knew, or now know, that opinion is peculiar to me. Its novelty, and the rational deduction of the fact from the premises, justified its publication, in the double hope of establishing its truth, or of exposing the error. Mr. James Fife has contested its correctness; and while I have neither leisure nor inclination to discuss, with labored minuteness, my own opinion, or his replication, I will proceed to make a brief reply.

Mr. Fife says, in submitting "some difficulties that lie in the way of my proposition and illustration," he could, "for example, select lands in the torrid zone, exposed to the heat of a vertical sun, and producing large crops, notwithstanding the frequent stirring in the hottest time. How is this, if the sun kills the nutritious principles of the earth?" It is said there are exceptions to all general rules, and correctly. Mr. Fife may know of some land in the torrid zone which produces "large crops, notwithstanding the frequent stirring in the hottest time;" but, I marvel greatly if such be the fact. Let it be borne in mind that I have not said that one crop, or two, or ten crops of corn, tobacco or any other plant, would in every grade and variety of soil produce effects equally injurious. I did not, and could not say, that rich river low ground would be exhausted as soon as poor river hills. The poorer land is, the easier is it reduced to sterility. Now, it must be obvious to the capacity of every man, that land under the torrid zone which has been often cultivated and still produces good crops, must have been, originally very fine, or have been made good. If it was originally good, I venture to say it is now worse, unless improved by art. Will Mr. Fife say, that, after repeated consecutive cultivation by that minister of desolation, the shovel plough, it is as good as when first the forest was felled? Can he venture such a declaration in the face of the whole earth? The testimony of every man—of every "beast that bites the grass or browses on the shrub" will confront and confound him. I will not attempt to prove what is universally known to be true, that all land—land of every grade of fertility, of every geological base, from barren sand to the deep and inexhaustible beds of alluvion on the shores of the Mississippi, deteriorates under the cultivation of corn, cotton, tobacco and other spring crops, which require the earth to be kept pulverized until the plant is matured. But, it deteriorates in a greater or less degree as the land is poorer or richer. The thin soil of sand hills vanishes in the third crop of corn, cotton or tobacco; while the soil of the Mississippi, the Red River, the Yazoo or Big Black, twenty feet deep, cannot be exhausted till the bottom be reached; for as the vegetable mould of which it is composed sinks beneath the exhausting action of the sun, the plough descends with it to a bed not heretofore disturbed. It may be, that land in the torrid zone, of the same base, is not so much injured by cultivation as in our latitude. The rains of that region are more frequent, and dews manifold more copious than in Virginia The moisture of a southern atmosphere is, also, a part, and a leading part of its natural history. Here our summers are dry, and the sun more intense than far south of us. They are, at stated hours of the day, refreshened, by steady breezes from the sea always charged with invigorating salt-water vapor; and at night their copious dews impart a delightful coolness to the air. Here we have, occasionally, slight breezes—generally dry; slight dews till late in the summer, and hot nights. In the north the land is not galled as here, in part owing to three causes about equal in their effects:—the sun affects us two months longer in the year than it does them—their land is better cultivated, and there is no negro labor to beget idleness and its handmaids, shovel ploughs, new hopes and disappointed expectations, rags and debt.

It is known to all, that one of the principal means of improving worn out land, is the mould-board ploughs, the bar-shares of my friends and countrymen, McCormick, Stewart, Kemper, Fletcher and Green. The benefit is derived, in my opinion, from various causes. The earth which has been exhausted by the sun is turned under, where it is kept till the next fallow, while the loam or other soil never before reached by the plough is thrown to the top, where, from the action of the sun, rain and atmosphere, noxious principles are expelled or neutralized, or those that are valuable are imbibed. I suppose that Mr. Fife did not understand me to say, that the sun, in all the degrees of its influence on the earth, is injurious.

All crops that require frequent ploughing in the spring and summer, corn, cotton, tobacco, turnips, &c., have the character of exhausting crops, when others that yield as much in weight are known not to impoverish the ground: for instance, wheat and rye. If it were not the mode and period of cultivation that does the injury, principally by exposure to the sun, all crops of equal weight would reasonably do equal harm. The universal testimony of experience is, however, that corn, cotton, tobacco and turnips, are exhausting, and, that wheat and rye are improving crops. What other cause than the mode of cultivation can induce so great an injury? The repeated ploughings, erroneously deemed to be necessary to make these crops, renders the earth so light or loose as to receive the heat of the sun to the depth of the ploughing. The top earth is most injured because most exposed to the sun, and after it has been subjected to his rays for some time, another surface is thrown up by another ploughing, and so on, till the whole body ploughed for corn, &c. is successively operated upon, and finally, the whole is left open for years before it regains its former compactness. Clay from the bottom of wells, cellars, &c. after a few years produces luxuriantly.

As to Mr. Fife's notion that the mixing of water with earth destroys the fertility of the earth, I can say no more, than it is the first time I ever heard that water was not a valuable, nay, an indispensable agent in the growth of vegetables. Heat is also indispensable; but too much of either destroys vegetable life; and "mortar" contains too much of the former. It is true, that by mixing water and earth more intimately than by the usual falling of rain, when dried it is harder; but no other injury can be done by the admixture. If it can, the more rain the greater the injury; and what then becomes of the well established fact of the fertilizing properties of water? The bottoms of rivers and ponds too would be very poor instead of being very rich. Roads that have been used for seventy years, although trampled thousands of times more than mortar for bricks, it is every day's practice to reclaim by the usual methods of improvements. Let me here make the conjecture, that if the dust of hard burnt bricks be subjected to the same means of improvement with well trodden roads or dried "mortar," that the end will be a thorough conviction of the impracticability of the one, and the easy accomplishment of the other.

Mr. Fife is respectfully advised to visit north Alabama, (the great bend of the Tennessee,) a country of as high reputation for fertility, a few years ago, as any in the south, and see for himself, its present thriftless condition. Originally, indeed, not more than fifteen years ago, very rich, of dark red loam, with a surface among the most beautiful and convenient for the purposes of agriculture on earth; the effects of the sun upon it, exposed as it has been by shallow ploughing, have been ruinous. Corn and cotton have thus ruined that, as corn and tobacco have this country. Again let Mr. Fife go into the Dutch settlements of Rockingham, Shenandoah, Loudoun: to Pennsylvania, New Jersey, and New York, where they have to a very small extent cultivated corn; where wheat and rye are the staples and are produced abundantly, and he will see the difference between those regions, and the land of corn, tobacco, and cotton.

It is generally thought that the hickory, lombardy poplar, &c. exhaust the earth, and that the yellow locust improves it. The instances cited are where the land is cultivated in corn or other spring crops. The earth under the former is generally exhausted where it *is cultivated;* but not so under the latter. The reason is that the roots of the former are much more shallow than those of the locust, and of course, the ploughing is not deep. The body of earth thrown up by the plough under the poplar and hickory, is not half so deep as under the locust, and the power of the sun is proportionally greater on it. Who is he that can point out the difference in the fertility of the ground well covered by grass, where the largest poplars and locusts have grown for many years in the same yard? The earth under trees, whose roots are shallow, is merely scratched on the first ploughing, and from the repetition of it appears to be dead or exhausted; while under the locust, the apple, the peach tree, &c. &c., whose roots are deep and not reached by the plough, its advances in improvement are at least as fast as where there is not a tree.

My communication is growing too long, and whatever other views I have, must, if at all, be forwarded to you hereafter. Such as are here thrown together depend rather on the experience than the theories of men.

J. R. WALLACE.

From the Genesee Farmer.

THE BUFFALO BERRY.

Last autumn we procured of Judge Buel, three trees of the buffalo berry; and this spring when they came into flower, we found that one plant is *staminate* and the other two *pistillate.* This discovery is very gratifying; for it is well known that like the date palm, none of these trees are expected to be productive unless both sexes grow in the same neighborhood. Whether there is any way to propagate them except by the seed, we have not been informed. Last year we tried *layers* on another plant which we had previously obtained; but none of them rooted. If it could be increased by some such mode, we could then be certain of having both kinds; and we should not be subjected to the risk of having only *one* sort when we procure *two* trees. If they can be readily increased only by seeds however, it will be well to purchase only such trees from the nurseries, as have had blossoms; and as these appear while the trees are small, this precaution will not be attended with much inconvenience. Ours are not five feet high.

From the Genesee Farmer.

THE OSAGE ORANGE.

We have been informed that this fruit ripened the last season for the first time, east of the mountains. Our friend T. S. Pleasant has kindly supplied us with seeds from his trees at Beaverdam in Virginia; and we have now a number of plants which sprung from them in a hot-bed. They germinate freely.

This tree is also *diœcious.* We have a pistillate plant eight or nine feet high, which now appears to be preparing to blossom; but as this is the only tree of the sort in our possession, we cannot expect much fruit—which however is only to be prized as a curiosity, or as the means of propagation. Pistillate trees indeed, sometimes produce hermaphrodite flowers, and consequently some fruit; but never in much quantity; and this exception to a general rule, seems only to be a provision of nature for preserving the species under extraordinary circumstances.

With *layers* of this tree we have always been unsuccessful; and equally so with *cuttings* of the branches, though we have succeeded with pieces of the root. Whether we shall hereafter become more skilful or not, is uncertain, but at present we are inclined to believe it can be most readily increased by the seeds.

From Jameson's Philosophical Journal.

SUBTERRANEAN LAKE AND ITS INHABITANTS.

"The most striking example which we can mention of a subterranean sheet of water, of a varying level, is that of the Lake Zirknitz, in Carniola. This lake is about six miles long by three broad. Towards the middle of summer, if the season be dry, its surface rapidly falls, and in a few weeks it is completely dry. The openings by which the waters retire beneath the soil may then be distinctly perceived, sometimes quite vertical, and in other places bearing a lateral direction towards the caverns which abound in the surrounding mountains. Immediately after the retreat of the waters, all the extent of the surface which they covered is put under cultivation, and at the end of a couple of months, the peasants are mowing hay, or reaping millet and rye, in the very spot where, some time before, they were fishing tench and pike. Towards the end of autumn, and after the rains of that season, the waters return by the same natural channels which had opened a passage for them at the time of their departure. The description which we have just given of the inundations and retreat of the water, is the regular and common occurrence; but every extraordinary atmospheric change is apt to interfere with this order. Sometimes a very heavy fall of rain on the mountains with which Zirknitz is surrounded occasions an overflowing of the subterranean lake, which advances, during many hours, so as to cover with its waters the land which lies over it.

"Very singular peculiarities have been remarked as belonging to these different openings in the earth: some of them supply nothing but water; others supply a passage both to water and to fishes of a greater and smaller size; and there is a third class by which ducks are supplied from the subterranean lake.

"These ducks, at the moment that the water floats them to the surface above ground, swim with perfect facility. They are completely blind, and almost naked. The faculty of sight, however, is very speedily acquired; but it is not till after two or three weeks that their feathers, which are black, except in the head, are so grown as to allow them to fly. Valvasor visited the lake in 1687. He himself caught a great number of these ducks; and saw the peasants catch individuals of the *Mustela fluviatilis*, which weighed two or three pounds, tench of from six to seven pounds, and, finally, pike from twenty to thirty, and even to forty pounds weight. Here, then, it will be perceived, that we have not only an immense subterranean sheet of water, but a real lake, with the fishes and ducks which frequent the common lakes of the country."

For the Farmers' Register.

REVIEW.

Survey of the tide-water region of Maryland, and report thereon, by J. T. Ducatel, *8vo. pp.* 61. *Document published by order of the Legislature of Maryland.*

The legislature of Maryland has latterly, in several important matters, exhibited a rare and laudable degree of attention to the general improvement of that state—and the means adopted to forward that great end, are manifestly not planned in subserviency to any narrow minded feelings of sectional jealousy, but are dictated by a liberal and patriotic disposition to use the means of all, for the general benefit of all. May the results be fully commensurate in reward with the enlightened acts and liberal means employed, and with the noble spirit which has prompted them.

Among the several means for promoting "internal improvements"— (a term generally, and with a singular degree of incorrectness confined in the United States to making roads and canals—) one of the least costly, and which was probably considered as of least importance, was directing to be made a geological survey of the territory of Maryland. But it may well be doubted whether the future benefits of a well conducted examination of the mineral treasures of the state, the making known all its dormant resources of wealth, and the instructing its citizens as to the manner of reaping such rewards, might not yield a richer harvest, than even the millions of dollars bestowed upon its magnificent canal and railway. And even if the actual plan, and consequently its execution, be defective, the benefits to be derived, though produced indirectly in a considerable degree, will nevertheless be of great value. We shall make free to point out what appear to be some of the defects either of plan, or of execution: and this freedom will be used the more readily because of the high value attached to the general plan, and the anticipations of beneficial results from its execution, so far as it has been completed, not only to Maryland, but to her sister states—to whom, in this respect, she has offered an example already followed by Virginia, and which will doubtless extend farther.

The most important and most abundant substance, by far, among the mineral resources of wealth in lower Maryland, is the immense underlying deposite of shell-marl. Accordingly, the various beds, their localities, qualities, and practical value as manure, constitute the greater part of the matters embraced in the report. This exhibition cannot fail to increase the zeal and industry of the farmers who have already been deriving profit from this manure, and to attract attention from, and invite to similar efforts, the still greater number who have heretofore possessed this resource of wealth without knowing or enjoying its benefits: and persons elsewhere will also learn to attach a more correct estimation to the great improvable value of this highly favored, and yet heretofore neglected and undervalued region—abused as in Virginia, both by the opinions of strangers, and by the practices of its cultivators.

The report has so far only embraced the tide-water region of Maryland, and the remarks on it which it is proposed to offer, will be confined to the most important object of investigation—the beds of marl. The results of the geologist's own observations will be copied at length.

"*Southern limits of the shell-marl deposite on the Eastern Shore of Maryland, available for agricultural purposes.*

"There is reason to believe, as stated in a previous report, that this shell-marl deposite underlies the whole of the country between the Delaware and Chesapeake bays, even to its extreme limits; but, as was also previously observed, it evidently inclines on the Chesapeake side, from the summit level of the peninsula to the water's edge. The dip of the formation is at an angle of about 5° from north-east to south-west. The inclination is not, however conformable to, though in the same direction with that of the country; a circumstance which it is important to attend to, as a neglect of it might cause fallacious expectations to be entertained of the discovery of marl in situations at its north-east extremity where it lies too deep, for profitable extraction; and, on the other hand, might dissuade from a justifiable research in situations at its south-west extremity, where though lying low and the country flat, it still may be found at a small distance only below the surface of the soil. It is likewise necessary to bear in mind what has already been said on a former occasion, that the surface of the marl deposite undulates; so that, it not unfrequently happens that the opposite banks of an inlet, present to view the summits of two waves of marl, so to speak, the trough of which constitutes the bed of the creek.

"Observations so far made seem to indicate that south of the Choptank, in Dorchester county—in the lower portions of the county—the marl in general lies too low to be advantageously extracted. It has been reached in the sinking of wells; but the only place where any indications of it present themselves above tide, is on the Choptank, west of Cambridge—at a spot called Sandy Hill. The material alluded to is covered by a stratum of sand from fifteen to twenty feet, contains impressions of scallop, clam, and other shells, and was observed in the high banks of the river, from the spot just named to beyond Castle-Haven. Subjected to analysis it was found to consist of carbonate of lime 23, silica 58, alumine 13, and a small proportion of iron. This is no doubt a continuation of the shell-marl deposite of Talbot county; and as no other indications of marl have been observed south of the Choptank, in Dorchester county, it may probably be assigned as the limit of that deposite in this direction. It is not pretended however, to exclude by this assignation the upper parts of said county which have not yet been examined.

"*Principal location of the shell-marl deposites between the Choptank and Chester rivers.*

"These deposites are in Caroline, Queen Ann's and Talbot counties, and will be most conveniently indicated under the head of each county.

"*Caroline county.*—At the head of the navigation of the north-west fork of the Nanticoke, at Federalsburg, there is a deposite of marl which lies high, and in a very accessible position; it owes its formation to an accumulation of fossil oysters, and other small marine shell-fish, some of them extremely delicate, giving evidence by the integrity of their parts that they have originated and died where their testaceous coverings are now discovered, and appear to have been subsequently enveloped in a deposite of clay. The material of this deposite may emphatically be called *shell-marl:* the enveloping clay contains from fifteen to twenty per cent. of calcareous matter, and the chief constituent of the fossils is the same fertilizing agent. The soil of the surrounding country is principally a light sandy loam; so that the marl which has just been described consisting principally of carbonate of lime, and aluminous particles, is no doubt admirably fitted to impart to it the physical and chemical properties requisite to constitute a good soil.

"At Greensborough, the marl forms the substratum of the soil upon which the village is built. It breaks out on the west bank of the river, a few feet above tide. At low tide, it becomes very accessible, and from the nature of its constituents, as exhibited in the appended table, showing the result of the chemical analysis of the marls from the several localities in Caroline county, and the condition of the superincumbent soil, it will be perceived, that it must furnish a material of great value for the improvement of the latter. Reference must be made for the analysis of this marl, to No. 1. of the table.

"At Denton, or rather in its vicinity, several localities of marl were discovered, principally on the head streams of Watt's branch. They are generally, of excellent quality, and well adapted to use on the spots and in the vicinity of where they occur. See Nos. 2 and 3 of the table.

"Three miles below Denton, on the east side of the Choptank, there occurs a considerable deposite of fossil oysters, forming the mass of the banks of the river, from fifteen to twenty feet above tide. The neighboring country would derive great advantage from the general use of this material, and every consideration of individual interest and public usefulness, was accordingly presented to the proprietor of these valuable banks to induce him to employ their contents on his own lands, or dispose of a portion of them to neighbors willing to purchase. It is to be believed, that an intelligent citizen cannot long resist any proper appeal made to him, when conducive both to private interest and to public good." pp. 14 to 17.

This appears to be saying indirectly that the "intelligent citizen" had to that time not only refused to use manure from this inexhaustible body, but to permit it to be used by his "neighbors willing to purchase"—and it is only "believed" that "he cannot long resist any proper appeal made to him when conducive both to private interest and public good." If this is the meaning of the passage, the compliment to the marl bank and its owner is equivalent to a strong expression of deserved contempt for the latter.

"Another much more extensive, and more decidedly marly deposite, occurs on the estate of General Potter, at Potter's landing on the Choptank, between Kokias creek and Watt's branch. It affords several varieties of marl, (Nos. 4 and 5.) It is covered by a blue earth, which on analysis yielded the following constituents: alumine 10; carbonate of lime 9; silica 70, &c. This article might also be advantageously employed as an amendment to the soil by which it is overlaid; it is, in fact, a sandy marl. The enlightened and patriotic proprietor of this estate, has expressed his willingness to supply his neighbors with such quantities of these materials, as would afford them the means of satisfying themselves as to their efficacy." p. 17.

The owner of marl has as good right to sell it as any other commodity—though in some other places it is a thing unheard of for any man having an inexhaustible supply, not to *give* it freely to his neighbors. But it is a strange waste of encomium to speak thus in commendation of this "enlightened and patriotic proprietor" merely for having "expressed his willingness to supply his neighbors with such quantities as would *afford them* the means of satisfying themselves as to the efficacy" of his marl—that is, to let them test its value for his own future benefit.

"In the neighborhood of Hillsborough, marl of very good quality has, likewise been discovered.

"*Queen Ann's County.*—An important and valuable deposite occurs at the head of south-east creek, in the vicinity of Church Hill. It is found on a farm belonging to Judge Earle; at present, the residence of Walter J. Clayton, Esq. by whom it was made known. Its analysis is given at No. 6 of the table. Similar deposites may be expected to make their appearance at the heads of the several creeks, having a common estuary with the one just mentioned; namely, Hamilton creek and Island creek. Accordingly, an analogous deposite has been traced in the direction of the head of these creeks, to the north-east side of Corsica creek, reaching into that section of Queen Ann's county, known as Spaniard's neck.

"On the south-west side of Corsica creek, extending to the head of the branch south of Centreville, the marl is abundantly diffused. Nos. 7, 8, 9, 10, 11, 12 and 13 indicate the constituents of the various kinds found in this region, the samples of which, have been furnished by the gentlemen whose names are given in the marginal column of the table.

"Continuing in the same direction, being in a line north-east and south-west, to the head of Reed's creek, marl of superior quality (No. 14,) is found on the estate designated, as belonging to Maxwell's heirs. It is composed principally, of that variety of fossil shells, known in popular language, as *pearl shells* (*Perna Maxilla.*) These broad, thick shells, closely compacted together in the deposites, exfoliate, and crumble into almost an impalpable powder, by the least exposure to the air. They thus yield readily and abundantly, their calcareous particles to the soil.

Finally on Back Wye, where abundance, goodness of quality, and a judicious application on the part of those who are so fortunate as to possess the material, have co-operated, the most extensive benefits have already been realized. Nos. 15, 16, 17, 18, 19 and 20 of the table, indicate the chemical analyses; fossil constituents and localities of the marl in this section of the country. Nos. 21 and 22 indicate the constituents of two samples of shell-marl from Chew's island, taken from the estate of William Paca, Esq.

"*Talbot County.*—Nearly the whole of this county is underlaid by marl; but it presents itself under a variety of circumstances of unequal facilities for extraction, and is, as elsewhere, of very variable qualities.

"On the Talbot side of the Tuckahoe branch of the Choptank, it occurs in the high banks of the river from six to ten feet below the surface; but is exposed to view in the ravines that make down to the river. As every where else, it is undulating on the surface, occurring in a distinct stratum, from three to five feet in thickness, the inferior level of which, is six feet above high water mark; it is frequently covered by a crust of indurated marl mixed with sand, evidently caused by the action of the waters, which filtering through the loose soil above, on reaching the marl bed, have facilitated its decomposition, removing a portion of its calcareous constituents and depositing in their stead, silicious particles. The most remarkable deposite of this kind, is about three miles south of Hillsborough, on the farm of Thomas O. Martin, Esq.; a more interesting one, in every respect, can scarcely be pointed out in any other part of the county. In this place, the banks are elevated from thirty to forty feet above the river, and the deep ravines that descend to it, greatly facilitate the extraction of the material at all seasons of the year. This place may be mentioned as the only spot at which the bottom of the marl deposite is known to have been reached; unfortunately, the excavation was not sufficiently extensive to allow a satisfactory examination of its substratum; it appeared to consist in a stiff blue clay. The analysis of the marl from this locality, is given at No. 23 of the table.

"Descending the Tuckahoe into the Choptank, a little below Kingston, we reach the mouth of King's creek. The high banks on the inlet of this creek exhibit thick beds of good marl, (No. 24,) the shells of which are imbedded in a stiff clay. The bed at one locality—on the farm of Mr. William Pratt—is covered by a thick stratum of a very plastic chocolate-colored clay, which itself might serve as a useful amendment to the thin soils of the surrounding country.

"But perhaps the most valuable beds of shell-marl in this part of Talbot county, inasmuch as they may be made extensively available to the public demands for the article, are those which were fully described in the preceding report. They occur three miles below Dover bridge, forming the high bank from fifteen to twenty feet above tide, being one compact mass of fossil shells, and extending nearly a mile along the river, on the farms of the late Col. Smyth and Mr. Atkinson. These beds are in contiguous strata, apparently successive, and consist of vast accumulations, principally, in the ascending order, of oyster shells, succeeded by clam shells intermixed with other marine shells, scallop, clam and scallop, and uppermost principally of scallop. Endeavor was made to bring these beds into notice, with a view of enlisting them into the public service, by giving to their proprietors what was deemed proper directions for extracting the material, and salutary advice as to a just estimate of its value, in order to secure a constant and permanent disposal of it. The subject is now in progress of experiment. South of these banks on the Choptank, no other deposite of marl is known to occur." p. 19.

Several of the foregoing passages, in addition to many other incidental remarks through the report, exhibit in many of the land owners a degree of neglect and ignorance of the value of their bodies of fossil shells, which is the more strange and unaccountable, when it is considered that the first known profitable use of this manure was made thirty years ago in part of this region of country, (by Mr. Singleton) and that the example had been successfully followed on many other farms in Talbot and Queen Anne's counties. The practice has not to this day extended to the Western Shore of Maryland, where the means are unlimited, as is seen in a subsequent passage which will be extracted from this report.

The reader would naturally desire to know, but is not informed, whether the "plastic clay" mentioned in the last paragraph but one, is recommended for manure, supposing it to be *merely a clay*, or as containing other useful ingredients.

"It will have been remarked, that these deposites are described as lying high above tide. It is, in fact, from this boundary of the county, that the dip from north-east to south-west in the marl deposite previously alluded to, becomes most apparent: occurring so far in Talbot county, only a small distance below the surface of the soil, it now becomes covered in the middle districts by a heavy coat of gravel and sand, extending from north to south from the head of Wye to the Choptank, and reappears again at a lower level on the banks, at the termination of the numerous inlets that so conveniently and beautifully intersect the lower portions of the county.

"A reference to Map A, appended to this report, will convey a better idea of the extent and numerous localities of shell-marl in this section of the state, than a bare mention of them by name could do. Suffice it to say in this place, that a line drawn from the head of Skipton creek, touching the intervening creek between this and Dividing creek, and perhaps, prolonged to the Choptank, would limit the eastern boundary of that portion of the territory which embraces the great shell-marl formation of the county; whilst another line from the mouth of Pickering creek, enclosing the western banks of Mile's river as far as the ferry; thence, by the head of Plain dealing creek to the Choptank, and uniting with the water boundary of the county, would form its western limits. Nos. 25 to 41 on the table, indicate the chemical composition of the marls from the principal localities of this great deposite.

"*Nature of the materials contained in the shell-marl deposites of the Eastern Shore of Maryland.*

"It is important to become acquainted with the precise nature of materials contained in these deposites; because upon this knowledge in a great measure depends the judicious application to be made of them. It is more especially to furnish such information that the table which has been so frequently referred to was made out. Some general remarks under the present head seem, however, to be necessary.

"Perhaps the true nature of these deposites is this. They are vast accumulations of the exuviæ of testaceous animals, formed at a time when the portion of dry land where they are now observed, was the bottom of an ocean. There is no evidence that their present elevated position is owing, to any upheaving of strata from below—the favorite geological notion of the day —nor to a simple retreat of the water from above them. They are generally overlaid by a thick covering of water-worn materials, such as gravel and sand, occasionally enveloping boulders of rocks belonging to the oldest geological formations; sometimes they are covered by a heavy stratum of clay; occasionally by alternate strata of clay, sand and gravel. In no instance, save when they form the bottom of an inlet or creek, or when they occur in the bed of a stream, has their surface been observed to be denuded. Some cataclysm contemporaneous with the cause of the retreat, has no doubt, occasioned the formation of these superincumbent strata. It is not worth while however speculating about this, at present; although it may be useful to know that the material by which the marl is covered is not contemporaneous with the marl itself.

"It is useful to know this, for two reasons. First, to become satisfied that the nature of the superincumbent soil cannot in any case be expected to partake of that of the underlying stratum of marl; hence it is never found to contain calcareous particles. Secondly, to understand the cause of the variety in the ingredients with which the marl is associated; thus we find the shells sometimes enveloped in clay, at other times in sand, and then again in a mixture of sand and clay, these two ingredients being in very variable proportions.

"Now although the marl does not influence the nature of the soil lying over it, the latter frequently greatly modifies the quality of the marl beneath it. The cause of this is apparent. The superincumbent earth (understanding thereby the whole mass of materials covering the marl) consists either of clay, gravel or sand, or a mixture of all these, and having, it is presumed, been deposited upon the marl subsequent to its formation, it will, from a variety of causes, have become mixed with it. It is, however, more especially by infiltration that the marl becomes modified in consequence of the condition of the soil above it. If the latter contain fine particles of sand, as is very commonly the case, these will be taken up by the waters that traverse the soil, and so charged, will penetrate more or less deeply into the marl bed. Should the shells there be loosely scattered in their mineral envelope, which is also frequently sand, the whole of their calcareous particles may be dissolved and become replaced by a silicious deposite. The bed of fossils will in this case, at least in its upper portions, exhibit an accumulation of indurated *casts* alone of shells. Such is the case in many places on Chew's island, in some of the fossil deposites of Skipton creek, and in several places on the Wye. It is evident that then the material cannot be used as marl. When again, the superincumbent soil is ferruginous, it very generally happens that the shells are bound together by an argillo-ferruginous cement extremely hard, which unfits them for use not only in this respect, but also by substituting for the calcareous ingredient which they originally contained a predominating constituent of oxide of iron, which cannot be beneficial to the soil.

"It must be borne in mind, however, that this sort of disnaturing of the shell-marl is most generally confined to the upper portions of the deposite. Hence, if in the search after marl, those silicious or ferruginous incrustations are met with, they should always be removed to ascertain the nature of the material beneath. There is a very remarkable example of a thick coat of silicious incrustations covering very excellent marl, on the estate of William Carmichael, Esq. on Back Wye, Queen Ann's county.

"As to the fossil constituents of the shell-marl deposites on the Eastern Shore of Maryland they are very various. Some are principally composed of oyster shells, others principally of scallop, some again principally of clam, and in others nearly the whole bed consists of *perna*, commonly known by the name of pearl shell. These last furnish decidedly the best marl. The perna is a broad, thick shell, somewhat in the shape of a large oyster, of a white pearly appearance, peeling off in thin laminæ that are very soft and friable. When exposed to the atmosphere for a short time it falls into an almost impalpable dust, consisting essentially of carbonate of lime. This shell occurs in most of the marl beds of the Eastern Shore, but more especially in those of Talbot county, and as already stated, at the head of Reed's creek, in Queen Ann's county.

"The quality of the marl is also greatly influenced by the nature of the shells that compose it. It was stated in the former report, and may be repeated here, in illustration of what has to be said under the present head, "that those beds which consist principally of *clam shells*, usually associated with numerous varieties of other smaller bivalve and univalve shells, containing at the same time very little admixture of foreign ingredients, yield a marl which exhibits its beneficial effects upon the soil in a very short time; because the calcareous particles are derived from shells which are very prone to disintegrate when exposed to the atmosphere. Marl beds, composed entirely or principally of *oyster shells*, are much less valuable, because of the slow disintegration and decomposition of this species of shell. *Scallop shells* resist such decomposition still more obstinately than do oyster shells, and when they occur, as they have been observed to do, in extensive beds firmly agglutinated by an argillo-ferruginous cement, they are useless in all soils, and may be positively injurious to some."

"It follows then, that the nature of the material in the shell-marl deposites must be ascertained first in reference to the species of shells which it encloses, and their admixture with foreign ingredients, as clay, sand, gravel, &c. This can be done by a simple inspection aided by such experience and knowledge as can be acquired without any difficulty. But a more important consideration relates to the *composition* of the marl, and especially to the relative proportions of its three principal constituents, namely, carbonate of lime, alumine and silex. To ascertain this recourse must be had to a chemical analysis. The proportion of calcareous particles is doubtless generally the most important fact to be determined; but it sometimes becomes equally important to ascertain the proportions of aluminous and silicious particles; for, one of the advantages, and not an inconsiderable one, in the application of marl is its use in ameliorating the mechanical condition of the soil, and these ingredients are eminently serviceable in this way.

"From what has already been said, it will readily be perceived that great variety must also necessarily present itself in the chemical composition of the marl in its different localities. So far as experiments have been conducted, it has been found that the proportion of calcareous particles varies from 20 to 60 per cent.; that of aluminous from 10 to 20 per cent. that of silicious ingredients from 30 to 59 per cent.

"It is doubtful whether any directions could be given which would enable those unpractised in chemical operations and manipulations to ascertain with any degree of accuracy the relative proportions of these constituents of the marl. This is a subject which must be submitted to some analytic chemist; and it is the duty of the geologist to satisfy inquiries of that sort whenever called upon for that purpose. On the proposed geological map of the state, it is contemplated to express the composition of the marl in the principal localities that will be laid down; and by extending the table exhibiting the chemical analyses of these marls, to all such as can be conveniently procured, a mass of information will be collected that will in some measure supersede the necessity of any further experiments.

Though the words of the last three paragraphs, if very strictly construed, may be maintained to be correct, yet they will probably convey a very different, and as we think, an erroneous impression to most readers. It may be readily conceded that no "directions could be given which would enable those unpractised in chemical operations and manipulations, to ascertain with any degree of accuracy the relative proportions of these constituents of marl"—if "these constituents" are to be separated with absolute accuracy, as arranged in the table of marls analyzed (p. 61,) under the heads of "*silica*, *alumina*, *lime*, *carbonic acid*, *oxide of iron*, *potassa*, and *water*." To execute this separation correctly, would indeed require not only the labors of an "analytic chemist" but of one of a very high order of talent. If all Dr. Ducatel's analyses of calcareous marls were as carefully and accurately made, he has gone through a most laborious undertaking, and to very little purpose. But if this array of scientific terms and arrangement had not been brought forward, and served to create apparent difficulty, and the operation is confined to what is important and necessary to the farmer, the very opposite of the above opinion might be truly expressed, viz: that any person of ordinary intelligence may easily learn to analyze his own calcareous earths—and for all useful and practical purposes, with as much correctness as the analytic chemist. Farther—the results so to be obtained, would be even more correct than those of the author's analyses, on account of a defect in his mode of examination, which will presently be noticed more particularly. Such directions (for example) as are given in the Farmers' Register, Vol. I. p. 609, if attended to, will enable any one to analyze marl so as to know the amount of calcareous matter—and if desired, the proportions of silicious sand and aluminous earth, or pure clay, are as easily found. The two latter ingredients, however, would seldom require more nicety of observation than a glance at the residuum, as shown after removing the calcareous parts. The proportion of oxide of iron is still less important—(at least for any purpose yet known;) of "*water*" as a *chemical* ingredient of calcareous marl, our ignorance is readily confessed—but at all events, its presence cannot affect the value of the manure, except in adding to its useless weight. The column for potassa (potash) is a blank throughout the whole list of calcareous marls (being found only in the *green sand*, and not in calcareous marl proper,) and therefore is manifestly not necessary to be sought for in such marl. Then as to the main and all-important ingredient of marl, the calcareous earth, or carbonate of lime, an unnecessary obscurity is thrown over it by stating its amount in its two component parts of *lime* and *carbonic acid*, in separate columns. There is no reason for this, as these constituents always combine in certain and invariable proportions, to form carbonate of lime. But this is not known to every reader, and therefore the arrangement adopted keeps many entirely in the dark as to the strength of marl, and is even somewhat embarrassing and troublesome to the inspection of those who well know the proportions in which the constituents of carbonate of lime combine. If, for example, the marl marked 6 in the table, (p. 61,) had been stated to contain 38 parts of carbonate of lime, or shelly matter, in the 100, it would have been plain to every one: but as it is there stated to contain 21.25 of *lime*, and 16.15 of *carbonic acid*, it may be well doubted whether the information contained is not hidden from most of those interested in the report, and for whose benefit it was specially designed. Indeed, the constituent parts are improperly stated chemically, as well as for common and practical purposes. Neither "lime," nor "carbonic acid," ever exists in marl—but a third substance formed of these two. If it were proper to name the separate constituent parts of a body, though never found except in combination, instead of the compound itself—then the author ought to have gone back a step farther, and stated these ingredients in the more remote elements, which constitute by their combination the lime and carbonic acid—dividing the first into *calcium* and *oxygen*, and the latter into *carbon* and *oxygen*. Yet we have known nearly a dozen different men and boys, who, without knowing the meaning of either of these terms, or even in what proportions carbonic acid and lime combined to form the carbonate of lime, could analyze marl with so much ease and correctness, that their results might be received with confidence. To separate correctly and ascertain the proportion of the calcareous ingredients of marl, may be learned and practised more easily than either of the household jobs of making a pot of soap, or a loaf of good bread—both of which are also chemical operations. The process is so mechanical, that it has occurred to our mind that the business of *marl proving* was one that might be carried on advantageously for the undertaker, and still more so for his employers or customers. Any intelligent youth, or female, might learn the processes in a few days, and then, if receiving sufficient employment, might analyze any specimens of marl furnished, for a very small compensation, and yet make good profits. The indolence or negligence of most marling farmers will always prevent their performing this necessary operation for themselves—and perhaps many who even understand the process, would prefer to pay 50 or 100 cents for each trial, to any competent person who would undertake the trouble.

But besides the making a mysterious and difficult business of a very simple and easily practicable operation, there are strong objections to the results of the author, even though obtained by so much superfluous skill and care. In the general remarks on the table, he says—

"The owners of the marl-beds from which these specimens were taken, are informed that the operations for analysis have been conducted on small quantities of the marl (generally the friable portions of it) the larger fragments of fossil shells having been cast aside; so that when applied in considerable quantities, these shells will by their disintegration, furnish an additional proportion of carbonate of lime and consequently enhance the value of the marl. It was deemed more advantageous to operate in the manner just indicated, in order to ascertain more accurately the respective proportions of the different ingredients."

It is very true that this disintegration will go on, and consequently enhance the value of the marl; and the practical marler knows that this process generally proceeds so rapidly, that to exclude all the larger fragments of shells from the analysis, is equivalent to destroying its pretensions to accuracy. There are certainly objections to including the most indestructible shells, without any separate notice, and counting all the parts as alike: but of the two, this mode would be more correct, agriculturally as well as chemically, than the one adopted. The farmer knows, or will soon learn, that the fossil oyster, and scallop shells are very slow in coming to pieces, and that therefore they are of but little value. But the white shells seem to be dissolved by combining with the soil, (if in a soil much needing calcareous manure,) and however solid when applied, will mostly disappear in a few years.

So much as to the analysis itself. But even if that process is perfectly accurate, and altogether unobjectionable as to each particular specimen of marl, the manner of selecting the specimens may have been such that the results of analysis may be of little value for showing the average strength of even one body of marl—and of far less, as evidences of the average quality of the marls of a neighborhood generally. The geologist does not always say how his specimens were obtained: but as it is almost impossible that he could have selected many himself, it may be inferred that most of the specimens were selected by other persons. Then the chemist is not responsible for the specimens showing any thing like fair averages of quality, and there are several reasons for believing that without a proper and careful selection of specimens, the most correct analysis is of no value, except as showing the constitution of the particular specimen examined—or (in some rare cases,) some new ingredient, (as green sand, for example,) and of course suggesting the probability of the presence of that ingredient through an extensive region. When the author describes the marls of a particular farm, and even generally of a neighborhood, he refers, in most cases, (as is seen in the foregoing extracts,) to one or two specimens only, in his table, to show the quality. Now we have rarely, if ever, seen a single bed of marl dug into eight feet, that did not present different layers of various degrees of strength in shelly matter. Sometimes one layer lying within a foot of another, above or below, is of double the strength—and sometimes a bed which in part contains 60 or 70 per cent. of carbonate of lime, will in another part be below 20, and not worth using. The diversity is greater in different beds on the same farm, and still greater through a neighborhood of some extent. Of course, one or two specimens, and especially without particularly describing the precise locality, and from what part of the bed each was taken, could give but little if any information, even if selected by the geologist himself. But if selected by othes—either ignorance, or carelessness, or self-interest, or a desire of a proprietor to show better marl than others, might cause an exhibition of a very rich specimen from a bed generally much poorer. For these several reasons, but little importance can be attached to the results presented in the table of calcareous marls—and so far as our latter objections apply, the fault is not the author's, (nor the proprietor's) but of the plan fixed by law under which he acted, and by which he was bound to be governed. In making it the duty of the geological surveyor to analyze the various specimens of marl, soil, &c. sent him by any proprietors, he was left no choice but to perform a vast deal of arduous, yet mechanical, and often useless labor, of which the results must be necessarily mostly mere rubbish. The worker of a marl pit who desires to know its average strength, should take specimens carefully and fairly selected at various depths, and certainly at every change of appearance. A single digging may sometimes require a dozen trials, if great accuracy is deemed necessary. But after this is done, the same bed might be worked for years, without showing a variation worth notice, from the same general character, or average strength. And indeed, the practised eye may easily know the same bed though found at some miles distance, and may be satisfied with the analyses made from the earlier known locality.

The observations made by the author through the report are as often agricultural as geological, and on that account might be supposed to promise the more value, to the farmers of Maryland. But the duty was of course confided to one chosen as a geologist and chemist, and not as an agriculturist—and however desirable the union of all three branches of knowledge may be in the individual appointed to make a geological survey, it is not to be looked for. But it may perhaps deserve consideration whether the general and most important objects of such a survey would not be advanced by the aid of an intelligent agriculturist to the more scientific labors of the geologist, and which should be confined to drawing these practical deductions for which the man of science is rarely qualified. If one of the many enlightened farmers of the Eastern Shore of Maryland had for this purpose been associated with the geologist the latter might have been saved much of the trouble of making observations of matters of practical agriculture, and that branch of the subject could have been made far more full, correct and useful.

It seems to be a remarkable deficiency in the report, that though it was made by the law part of the surveyor's duty "to analyze and ascertain the qualities and properties of all specimens of mineral substances, *or soil*, left at his office or residence, for that purpose by any citizen of the state, and taken from any portion of the territory of the state"—that not a single analysis of any *soil* is given. Nor is there any indication of the constituent parts, other than such as the eye of an unlearned observer might direct, except that it is incidentally and slightly observed (p. 21) that the soil lying over the marl "is never found to contain calcareous particles." If the author meant to convey (as is maintained generally in the Essay on on Calcareous Manures—) that the soil is generally, if not entirely destitute of any portion of carbonate of lime—it would have been gratifying if he had been more particular, and had commented on the remarkable difference in that respect between the soils of that region, and the usual constitution of most of those soils in Europe of which any knowledge is to be gained from books.

In furnishing directions for working marl pits, and applying marl, and making observations on the practical effects of the manure, the author quotes largely from the Essay on Calcareous Manures, to which work due credit is given. We will pass by this part of the report, and proceed to the account of the beds of marl, and the green sand formation of the Western Shore of Maryland.

"*Principal localities of the shell-marl deposites on the Potomac, their constitution, relative value, and use.*

"As the use of marl has scarcely been at all resorted to on the Western Shore of Maryland—although from its quality as it there occurs, and the condition of the soil by which it is overlaid, its application would be of the greatest benefit—it is deemed a matter of infinite importance to indicate, as precisely as the extent of the examinations so far made will permit, the situations in which it has been discovered, or where it is likely to be found by proper research.

"A very extensive and very accessible deposite of marl occurs near Piscatawa, on the north side of the creek. The bed is overlaid by a thick crust of indurated shells and sand, that can, however, be easily removed, and beneath which is the friable marl in an excellent condition for immediate use. The analysis of this marl is given at No. 42 of the table. No. 43 indicates the constitution of a marl occurring under similar circumstances with the preceding, at Upper Marlborough. These two localities are to be considered in fact, only the most prominent points of a great fossil deposite, extending from Fort Washington to the west branch of the Patuxent. This deposite will, no doubt, be soon discovered on intermediate spots, from which it can be extracted with equal facilities, so as more generally to diffuse the benefits which its application to the soil must inevitably produce. The situations that may be indicated, as those where it is most likely to make its appearance, are along the small branches that make into the Piscatawa, on either side. The village of Piscatawa is based on a bed of marl, and in its vicinity, at a place called the marl bottom, the material has been employed with the usual success. We are indebted to Dominick Young, Esq. for this perhaps solitary, experiment made on the Western Shore of Maryland, on the good effects of marl. Much regret is felt, that, owing to the absence of that gentleman from his plantation, a full account of the result of his experience was not obtained. It is desirable indeed to ascertain the operation of marl on differently constituted soils, and a knowledge of their natural fertility or susceptibilities—never better discovered than by agricultural experiments—is essential, in order to arrive at safe conclusions. The directions given in a former part of this report as to the manner of employing the marl on the Eastern Shore, will no doubt apply here: at all events it will be perfectly safe to follow them on wheat and corn lands; but we possess, as yet, no information as to its effects on tobacco lands. Reasoning from analogy, no mischief can be apprehended from the use of marl on these as on other lands; but in order to direct its proper application, as to *quantity* especially, we should be aided by at least a few positive results. It is hoped that the efforts made to interest the planters of this part of Prince George's county in the subject, will soon supply this desideratum.

'Charles county, also, is abundantly supplied with marl. A great deposite of fossil shells, similar in character to that at Fort Washington, occurs between Pye's landing and Indian-head, stretching across Cornwallis neck to the Mattawoman. A partial application of the material from this locality, is said to have been made to the soil above it by the former proprietor of the landing, and report states that it proved very serviceable; yet it was discontinued. We have the assurance from the present owner, Mr. John Pye, that it shall not be any longer neglected. The banks of the Potomac, from what are termed the blue banks along Wade's bay to Smith's point, exhibit likewise one continuous deposite of fossil shells from thirty to forty feet above tide. Nos. 46 and 47 indicate the analyses of these marls.

South of the Mattawoman, and embracing the large tract of land between it and Port Tobacco river, the diluvial formation composed of gravel, sand and clay, having a depth of from one hundred to one hundred and fifty feet, rests upon a great bed of *blue marl*, possessing very remarkable characters. Subjected to analysis, it proves not to be rich in calcareous particles, but it frequently contains *potash* as one of its constituents, by which it becomes assimilated to the green marl, so called, of New Jersey and Virginia, known to possess very fertilizing properties, although frequently without a trace of lime; as was ascertained by Professor Rogers of William and Mary college. The analyses of these marls are given at Nos. 48 to 53 of the table. It may be well to remark, that the parcels submitted to analysis were obtained under quite unfavorable circumstances, being mostly the superior water-worn portions of beds thus uncovered at the bottom of ravines, and made known during our examinations of the past year. A transient inspection of these deposites led to suspect that at a greater depth, their contents would be found more valuable—inasmuch as they might be expected to yield a larger quantity of fossil shells, which by their disintegration would increase the proportion of calcareous particles. This conjecture has been verified by the subsequent researches of Capt. Walter D. Miller on Ward's branch in Nanjemoy. An immense agricultural resource is thus shown to be at hand for the benefit of this portion of the state, of which the intelligent planters of this district, in Charles county, will certainly lose no time in taking advantage. The places at which it has been so far discovered, are the heads of the small branches making into the south side of the Mattawoman, on the plantations of William Dulany, Esq. and Mr. John Pye; at the heads of similar branches emptying into the Nanjemoy, on the estate of Capt. Alexander Gray; and at Port Tobacco It may confidently be looked for at the head of all the deep ravines that furrow the highlands, to discharge their waters into the Potomac or its creeks.

"From the nature of this *blue marl*, and the condition of the soil belonging to the hilly lands in this section of Charles county—deprived in a great measure, by washing, of their natural soil—it is believed that small applications—say of ten loads, or one hundred bushels to the acre, aided by a few loads of stable manure, and repeated to a given extent at intervals of four or five years in proportion to the progress of improvement in the soil—would be very profitable. Such soils, moreover, as are apt to wash, will by this operation have their texture greatly improved, and will be found much less liable to run into gullies. An important observation related by Mr. Ruffin is that "when a field that has been injured by washing, is *marled*, within a few years after, many of the old gullies will begin to produce vegetation, and show a soil gradually forming from the dead vegetables brought there by the wind and rains, although no means should be used to aid this operation."

"The next variety of marl to be described as appertaining to Charles county, is perhaps the most valuable material of this kind which the state possesses. It has been identified, as well by its geological relations as by its chemical composition, with the green-marl of New Jersey and Virginia. This formation in Charles county, so far as it has been traced, occurs on the Potomac, between the mouth of Port Tobacco river, and the mouth of Pope's creek, constituting the high banks of the river in nearly the whole of this extent. The situations from which the material was procured for examination are, St. Thomas's Manor, at Chapel Point, and the plantations of G. Brent and R. Digges, Esqrs. Nos. 54, 55 and 56 of the table, indicate its chemical composition." p. 43 to 46.

"To give some idea of the value of this marl," the author then quotes at length from Professor Rogers' paper on the discovery of green sand in Virginia, [Farm. Reg. Vol. II. p. 129,] the statements of the remarkable effects produced on lands in New Jersey—and afterwards the description of that earth. As the entire communication is in the hands of the readers of the journal for which these remarks are designed, these quotations will be omitted here. The author then proceeds—

"The general appearance of the *green-marl* in Charles county, is pretty well represented in the name which it bears. This however. may be owing to its having been observed so far only on the dry banks. The particles of the so called green sand which it contains answer exactly the description given of them; "they are easily recognized by their want of lustre, the ease with which they may be bruised with the point of a knife, and the bright green stain which they then produce." Some of the fossils supposed to be characteristic of the formation, were also observed, especially the fossil shell called the *Gryphœa*, described as "having one valve very deep and convex, and the other flat;" and *lignite*, or carbonized wood. In two localities, at Mr. Brent's and Mr. Digges's, groupes of crystalized selenite, or gypsum, are found in the green marl; but as they occur always in the upper portions of the deposite, at a uniform elevation, and as it were in a continuous stratum, (the marl being covered with a thick coat of ferruginous sand and gravel containing iron pyrites,) it is presumed that the selenite is only an accidental constituent of the *green-marl* of these localities, produced by the decomposition of the pyrites and the action of the resulting acid upon the lime of the marl beneath. A similar formation of selenite, was described in the former report as observed in the shell-marl deposite at the mouth of St. Inigo's creek, on the St. Mary's, and this, as previously stated does not belong to the green sand formation. The phosphoric odor recognized by Professor Rogers in the marls of New Jersey, was not perceived in ours. But the foregoing points of similitude are sufficient to identify the deposites on the Potomac with the green sands of New Jersey and Virginia. On the other hand, a very useful accompaniment of the green marls of Charles county, is that of spheroidal masses of indurated marl, in shape resembling a gourd—whence they are sometimes called by the uninformed petrified gourds—and varying in size from the larger to the smaller kinds of this vegetable production. Some of these masses present when broken a nucleus apparently of the same nature as its envelope; others exhibit irregular cavities lined with an incrustation of a straw colored carbonate of lime, having the lustre of imperfectly bleached bees wax. Such is the character of these masses on the plantation of G. Brent, Esq. On St. Thomas' Manor, they more resemble irregularly shaped nodules, traversed by fissures, the sides of which are lined with selenite.

"Below Pope's creek, at Cliffton—a situation which was indicated by Col. Wm. D. Merrick, and visited in company with this gentleman and the owner, Mr. Latimer—there is an immense deposite of a *blue marl* exceedingly rich in calcareous matter, and containing moreover a notable proportion of the green sand. The analysis of this marl is given at No. 57, of the table. The bed of marl now referred to is elevated from thirty to fifty feet above high tide, and is covered by a stratum of diluvial gravel from ten to twenty feet in depth. It is decidedly one of the most important deposites of marl hitherto discovered on either shore of the Chesapeake bay. Whenever the value of its contents shall be duly appreciated it will prove the source of renewed prosperity to the adjacent country, and of wealth to its fortunate proprietor. That marl is destined to become ere long an article of barter and exchange, as lime, plaster of Paris, &c. are now, there cannot be the least doubt; and no situation is known in Maryland that possesses more advantages for its easy delivery and general distribution than Clifton. Should the public attention be called to this subject to the extent that it deserves, it is the duty of the state geologist to furnish proper directions for the best mode of extracting it. Other situations presenting the same, or not much inferior advantages, may be hereafter discovered.

"It was stated before that a stratum of *copperas earth*, was occasionally found associated with the marl of this region of country. It can be easily recognized by a greenish efflorescence which usually takes place on its surface after a very slight exposure, due to the formation of a saline substance characterized by a styptic taste, and very well known in the domestic and useful arts by the name of *green vitriol*. A stratum of this earth varying from twenty to thirty feet in depth was observed overlying the marl on the plantation of G. Brent, Esq. Care must be had not to confound this article with the green marl, which it somewhat resembles, as its application to the soil would probably prove injurious."—p. 47 to 49.

We have entire confidence in the statements and opinions of Mr. Rogers, as quoted by the author. But while admitting fully the facts of the remarkable and valuable operation of the green sand as a manure, in the cases cited, and in very many others, we more than doubt the soundness of what seems to be the deduction, that equal, (if indeed any) benefit may be expected generally on most soils of the region convenient to this earth where found in Maryland. The marl referred to above (No. 57) as promising so much value, even as an article of commerce, and stated as "*exceedingly rich* in calcareous matter, and containing moreover a notable proportion of green sand," contains, according to the table, only 13 per cent. of lime, and 11 of carbonic acid, (or 24 per cent. of carbonate of lime) and would be rated rather as poor than rich. We cannot be sure, from the manner in which the constituent parts are stated, how much of this specimen is properly *green sand:* but it cannot be large, as the potash, which forms one of its uniform constituent parts, amounts only to one per cent.

This singular earth, the green sand, offers a most interesting subject for both chemical and agricultural investigation—and one of which almost every thing is yet to be learned; and if the mode in which this manure acts, can be discovered, and its operation be secured in most cases when applied, then indeed it will prove a treasure of incalculable value. But so far, no chemist has even made even a plausible surmise of what constitutes the peculiar value of this earth, or how it acts: and we are at present persuaded that in practice it will rarely be found beneficial, unless when combined with calcareous manure, or applied to soil made calcareous previously by nature or by art. This is admitted to be an opinion, which, though founded in part on practice, needs many more experiments to confirm its truth. But if true, there can be no fair comparison of value between any certain quantities of calcareous marl and of green sand, as manures, unless the suitability of the soil for each is first ascertained. The application of one ton of green sand may in some cases add as much to the succeeding crop as 20 tons of shell-marl on another soil—and perhaps one bushel of gypsum elsewhere would be as striking in effect. But it would be a very incorrect deduction thence to estimate these several quantities of different manure as of equal value: and still more erroneous would the supposition be, if made in regard to soils, (such as we believe most in lower Maryland will prove to be,) on which neither green sand nor gypsum will show their best effects, until *after* the application of calcareous manures. According to these views, we infer that the marls of the Western Shore which are sufficiently rich in calcareous matter to be valuable on that account, and also contain a small proportion of green sand, will exhibit more effect from the latter, than even a pure green sand, without any accompaniment of calcareous matter.

Dr. Ducatel has found no trace of green sand in any of the marls east of the Chesapeake—but more or less of that substance is exhibited in all the specimens (in his tabular view,) on the western side, in Prince George's and Charles Counties. None of these are entirely destitute of carbonate of lime, as in much of the like formation in Virginia, and in New Jersey: but that ingredient is generally in small quantity, and in one (No. 54, from St. Thomas' Manor,) the proportion is only $2\frac{1}{4}$ per cent. Such earth as this certainly does not deserve the name of *marl*, if that term means a calcareous earth, or manure—and it is to be regretted that the countenance of a man of science should thus be given to this incorrect and inconvenient designation.

THE INEFFICACY OF LIMING SEED WHEAT AS A PROTECTION FROM HESSIAN FLY—TARRING SEED CORN.

To the Editor of the Farmer's Register.

I am aware that a large majority of your subscribers are as well, or better qualified than myself, to contribute to your valuable journal; this, however, shall not deter me from performing what I conceive to be my duty, and that of every farmer—being encouraged by the recollection of the poor widow's mite. If an apology should be deemed necessary for thus intruding, the only one I shall present is, that my example may prove an incentive to others, who, beholding my feeble efforts and penury, may be induced to contribute from their abundance.

But to the point. In Vol. I. page 351 of the Farmer's Register, there is an article, taken from the *Canadian Courant*, which professes to be an infallible method of destroying the Hessian fly, by soaking and liming the seed wheat. You, Mr. Editor, made some remarks upon this article, expressing your doubts both as to the remedy, and origin of the Hessian fly, and "invited the expression of every opinion sustained by well attested facts on a subject so important." Of the origin of this fly, I know nothing. As to the efficacy of the above remedy, I had little more confidence than yourself; but thought it wrong to condemn without trial, and accordingly made experiment as directed—by soaking and liming a half bushel of wheat. This I sowed upon a good piece of land, on either side of which, and upon like land, I sowed unlimed wheat. In the spring, when I discovered that the fly had commenced its depredations, it reminded me of the lime experiment; and I at once determined to test its efficacy by making an examination. In passing through some unlimed wheat, I found the fly quite numerous: when I reached the limed wheat, my sincere desire was, that the experiment should prove successful, and that not a vestige of the fly be found; but alas! Mr. Editor, how often are our fondest hopes blasted. Upon examination, I found the fly as numerous here, as elsewhere, and, I really imagined, that it was more so. When this wheat was harvested I could not discover that it possessed any superiority whatever over the other, either in quality or quantity. This experiment I have never tried but once, and do not doubt but that it has proved successful under peculiar circumstances. But from the trial I have made, I am satisfied in my own mind, and shall never attempt it again, until the remedy has been fully, fairly, and incontestably proven to be effectual.

Whilst I am writing, it will not be amiss, perhaps, to fill out the sheet; you can take it for what it is worth.

As the season for planting corn is approaching, permit me to recommend an article in the 14th Vol. 59th page of the *American Farmer*, to the perusal of your readers, upon the subject of preparing or tarring seed corn, as a means of protection against crows, hens, black birds, and all others of the feathered tribe. In case the work should not be at hand, I will give the substance of the article, which will be sufficient for any one who is disposed to try it. The process is as follows: "Take a peck of corn and pour on it hot water, (without detriment)—after standing a few minutes, draw off the water. The tar, having been warmed sufficiently to reduce it to a fluid state, is then applied to the corn in small quantities, stirring at the same time, until all the corn is thoroughly daubed with tar. Then apply plaster, ashes or lime, one of these substances, intermixed with the corn will prevent cohesion and give better thrift to the crop. A peck of corn is as large a quantity as will be found convenient to operate upon at a time. A quart of tar is sufficient for a bushel of seed. The tar however, should not be applied sparingly. No injury, to my knowledge, has ever been done to seed, by any part of this process. I have practised preparing my seed corn in this manner for more than thirty years, and can recommend it as an effectual security against all manner of fowls that have been known to disturb corn fields." It would seem perhaps, that the author of the above, was rather sanguine in his assertions; but if any statement of mine, as an anonymous writer, will have any bearing, or corroborate those assertions, I can bear testimony to most of the facts therein stated. The tarring process has been practised upon my farm for several years, and as far as it has come under my observation, I believe it to be an effectual security against the depredations of the whole feathered family. But there is another advantage from tarring corn, which is, that plaster adheres more readily, and in a much larger quantity, which is a matter of much importance in this section of country.

I wish that some of my Madison and Orange acquaintances could be prevailed upon to write for the Register, knowing that they possess much interesting and valuable information, which they willingly communicate orally, but when applied to to write, they seem to startle at the very idea; and that false sense of reserve, or a distrust in their own dormant powers, so frequently condemned, and which has been so injurious to the agricultural interest, causes them to lose sight of every other consideration. Owing, no doubt, to this cause, much valuable agricultural knowledge has been lost to posterity: its possessors choosing rather to keep it locked up in their own bosoms, and carry it unrevealed to their graves, than to communicate in writing a few plain, simple, unvarnished facts: such Mr. Editor, as are not only more convenient to the editorial fraternity, but more interesting and acceptable to the general reader. There are other matters that I intended to have noticed, but fearing that I have already trespassed too long, and that I shall run into the other extreme, of writing too much, I am therefore admonished to conclude. May success attend you in the cause of agriculture—which is the cause of our country.

CROOKED RUN.

Madison County, Va.

[We concur entirely with our correspondent in the general remarks on communications from practical men, and the strong aversion to writing which such men generally feel. There are hundreds among our readers, each of whom could tell sufficiently well in few words, of some facts, or observations, which would be useful to many other readers, and perhaps interesting to all. But in addition to the general repugnance to writing, (which this work has done what we deem its greatest service, in lessening,) thousands of such matters are kept back by those who know them, because, as they would say, if asked to give any such matter to the public, "Oh! that is quite too trifling to write about." Now, this is a great mistake, which reason alone and common sense ought to prove—but which would be proved beyond dispute to every one who would look over any dozen copies of different agricultural papers. It will be there seen that nearly all the articles copied from other publications are very short—indeed it would seem that with many editors the small size of an article formed its principal recommendation for selection and republication. We have observed that most of the very short original articles in the Farmers' Register on particular subjects, are republished in almost every agricultural paper of the country—while but few that occupy several pages are republished in any: and none that are long, however good, are favored with any thing like the extent of circulation, as many of the shortest, of very moderate claim to merit. Let any of our readers try the experiment, by sending us some practical fact or useful observation contained in half a column or less, stated in the most plain and simple manner, and also a communication of several pages drawn up with the utmost care, and in his best style—and we will pay any reasonable penalty if there are not manifest proofs exhibited afterwards that the first will have more readers, and more republications, than the last.

But though these reasons are stated as inducements for bringing forward the many short pieces which might be so readily furnished, let it not be thence inferred that we object to long ones, or that it is deemed desirable to compress any subject within smaller space than its full developement would make necessary. Such an inference, and the action under it, would be a greater error than withholding concise statements, because they cannot be presented in all the dignity of regular and extended essays. Every subject that deserves being treated at all, ought to be treated sufficiently in detail to be made clear—and to agricultural subjects more than perhaps any other kind, does this rule especially apply. That the length of a communication operates to lessen the number of its readers and to limit the extent of its circulation, is a fact which is to be lamented, but neither can nor ought to be disguised —and every writer may make good use of the knowledge of this evidence of the general carelessness or bad taste of the reading public, But if articles which require to be treated at length have fewer readers, they are at least more highly prized by those few; and thus perhaps gain as much, in the higher estimation of the few, as short articles do from a far more general, but more careless reading.]

From the Cultivator.

QUERIES AND ANSWERS IN RELATION TO SHEEP HUSBANDRY.

The five queries which are quoted below, came from an anonymous correspondent. They were forwarded to a gentleman preeminently distinguished as one of the best judges of stock, and withal an extensive breeder, who has promptly and very obligingly furnished us with the subjoined answers. *Ed. Cul.*

1. "Of what breed or stock had a beginner better compose his flock, his object being the growing of fine wool?" Pure Merino, crossed with high bred South Downs.

2. "What are the prices at which the Saxony, South Down, Cotswold, Leicester, Bakewell, or Merino ewes, can be purchased respectively, after shearing?" From a *good* flock, you cannot *select ewes*, or it would not long remain a good flock; lambs or yearlings may be selected perhaps—price very various—depending on purity of blood, and individual excellence.

3. "What breed produces wool of the greatest value?" Saxony *per pound*—Merino *per fleece.* "And what breed yields the heaviest fleeces?" The great Lincoln, or Romney Marsh sheep.

4. "What breed is most hardy and best adapted to our climate?" South Downs, *certainly.*

5. "On what lands how many sheep per acre can be profitably kept?" That depends on the breed of sheep, and quality of land, but much fewer than are generally kept.

The Saxon sheep undoubtedly produce the finest wool; but their fleece is light, seldom exceeding $2\frac{1}{4}$ lb. in weight, and is too open to resist our storms. They are feeble in constitution—require great care, are poor nurses, and their lambs are raised with difficulty. The mutton from such sheep must necessarily be of a miserable description.

I believe that in Connecticut, even the pure Saxony sheep may now be purchased at a comparatively low price, say from six dollars to four dollars a head, and perhaps lower still.

The *old fashioned pure* Merino sheep, which were imported by Col. Humphrey, and those associated with him, (but which are now almost extinct) were a much better constitution sheep, and *more* than made up by quantity for the difference in the quality of their fleece—the close, thick texture of their wool resisted our cold wet storms—their lambs were much easier raised, the ewes were better nurses, and on the whole, I am convinced they are a much more profitable sheep than the Saxony. I must, however, remark, there are several varieties of the Spanish sheep; and I would carefully avoid the "gummy"* family fleece, which however, must not be confounded with that, which, though of a dark color, contains only the grease necessary to render it impenetrable to the weather; the former being very objectionable to the manufacturer, while the latter is readily cleansed and worked.

I desire to be understood as speaking of the *pure* breeds, and not of *grade* sheep, which so universally abound in this state, for *they* have no distinctive or fixed character, but vary with their degree of consanguinity to the pure imported blood. Indeed I feel well assured that there are very few individuals of the pure unmixed blood to be found.

The earlier Merino flocks of this state, were obtained from the introduction of imported bucks, and those were purchased at great prices, which, with the native ewe, formed the ancestry of our fine wooled flocks; these had not attained nearly to the excellence of the pure Merino, in the staple of its wool—its compactness—its uniformity, or softness—when the Saxony cross was introduced, and became almost universal in a surprisingly short time—and this is the true history of almost all our fine grade sheep in this state. It is not, therefore, to these flocks that I allude, when I speak of *pure* Merino, or Saxony sheep.

As to price, I presume such Merino sheep are more costly now than the Saxony, from the fact that farmers are now aware of their error in using the Saxon cross, which has ruined the constitution of their flocks, decreased their clip of wool nearly one-half, and reduced their produce, until, with ordinary management, more than twenty-five lambs to an hundred ewes, are seldom raised. A Merino buck, of *unquestionable* purity, whose ancestry were both imported, will now sell for twenty-five and thirty dollars; the same animal, eighteen months since, might have been picked up at $8 and $10.

The Leicestershire, Bakewell, and Cotswold sheep are so crossed and mingled in this country, that the distinction is lost, excepting to the practised eye, who can find individuals in the various

* The term "gummy" is in common use with farmers, and will be understood.

flocks which partake, as it may happen, more of the characteristics of one parent or the other.—These are a long, coarse wooled sheep, possessing much beauty of form, early maturity, and are quick feeders; but they require rich lands for their pasture, and though their constitutions are good, yet their fleece is sufficiently open to admit the penetrating rains of our severe storms, and then it is, that their heavy fleeces are seen separated along the ridge of the back, thus admitting the wet directly to the skin, until the animal is chilled through. They are good nurses, and make fine lambs; their meat originally coarse and long in the grain, and white in its color, was much improved by Mr. Bakewell, and under his management, became superior to the other large, long wooled sheep. Some of the best flocks of this variety may, I believe, be found in the sheep-folds of Mr. Dunn, and Mr. Wilkinson, in Albany county, or of Mr. Adcock, Mr. Musson and Mr. Clark, in Ostego county, all of whom have given much attention to this fine variety of sheep. Average produce in wool, I should think, from five to six pounds, though individuals are found, carrying fleeces of ten and twelve pounds! Price of good lambs, I believe, from ten to fifteen dollars.

The South Downs are as yet but little known in this country, but in my opinion, are decidedly better calculated than any other, for the domestic purposes of our farmers. They are of a medium size, beautiful in their forms, large loined, broad chested, fine in the head, small boned, and fine in the fleece, which averages four pounds in the ewes; the bucks reach to seven pounds; in quality it is equal to half blood Merino, but stronger in its filament, and *entirely* impenetrable to storms of snow, sleet, or rain; they are regardless of our coldest weather, and possess hardier constitutions than any sheep I know. The wethers attain to about 28 lbs. per quarter, and are allowed to be the best mutton sheep in England, the meat being dark in color, short grained, mild in flavor, and juicy. They are excellent nurses, and quick feeders. Here again, I beg to be understood as alluding to the *pure* and *high bred* South Down; such as it is found in the sheep-folds of the great sheep masters in Sussex; not the common, unimproved animal of the Downs, weighing 14 lbs. per quarter, and carrying but 2½ of wool.

As to prices—they are best ascertained from the sources of the respective breeds, and must vary much, according to the established purity of the blood, and the excellence of the individuals; the one a much more difficult point to ascertain than the other.

For the last three years, preparative to commencing my own flock, I paid much attention to the sheep husbandry of this district; visited those who owned large flocks, and soon discovered that they were all on the decline; I corresponded with others, and found the introduction of the Saxony blood was universally followed by a decline of constitution, and all its attendant evils; excepting in one instance, where a gentleman wrote me, that he had just purchased a flock of Saxon Merinos. He assured me that in Oneida county, they were a hardy, healthy sheep—shearing on an average about three pounds of wool, and the purer the Saxon blood, the heavier was the fleece! ! This was so contrary to my own experience, having materially injured a flock of nearly two thousand grade Merinos by one single cross of the Saxony, that I still continued my plan of forming a flock from the *pure, full bred,* large Merino sheep on the one part, and from the high bred sheep of Mr. Ellman's flock of South Downs on the other. Assisted by the indefatigable perseverance, acute discrimination, and previous knowledge of a friend (whose father was concerned with Col. Humphrey in his various importations and sales of such sheep,) I collected, after 18 months search, about thirty full bred Merino sheep, pure as imported, *known* to be directly descended from those importations. Their quality of wool is as fine as perhaps any grade Saxony flock around me. The ewes will average four pounds fleeces. My South Downs I imported from the celebrated flocks of Mr. Ellman, in England, whose two year old wether sheep beat all England last Christmas, at Smithfield, and took the first prize. He was judged to weigh 32 lbs. per quarter; and I am happy to say, has been presented to me by Mr. Ellman, as a specimen of excellence, and will probably arrive in this country before long, as he was to be shipped from London the first week in this month, for New York. From Mr. Ellman, I procured six yearling ewes, and a *yearling* buck; the ewes have wintered in a yard with an *open* fence, and an open shed, closed only at the back; they lambed there from the 23d to the 28th of February, on which day the thermometer was as low as 4°. On the 1st, 2d, 3d, 4th and 5th of March, the thermometer, in the shade, was from zero to as low as 6 degrees below zero, at sunrise! and yet my lambs, young as they were, never suffered in the least from the severity of the cold; they never showed the slightest consciousness of its intensity! and are allowed by all who call to see them, to be the finest lambs they ever saw. I find a rapid demand for all I can spare from both my flocks, at liberal prices. The engagements for my South Down buck, for next season, have been filled for some months past; and two days since Mr. Musson, a Leicestershire breeder, called to see him, when I took the opportunity of requesting he would weigh him—he very obligingly did so; and his exact weight was one hundred and fifty-nine pounds and a half. I have ventured on these minutiæ in regard to the *high bred* South Downs, as these sheep are very little known in the United States; and facts are more satisfactory than opinions: and again I must insist that I do not allude to the *unimproved* breed; I do not allude to the South Downs of Cully's day, from whose writings I have seen various extracts as descriptive of the breed, nor do I include the Hampshire Downs; I confine myself to the *high bred sheep* of the present day; and if any would oppose to them the fast rooted prejudice of high breeding being inseparable from delicacy, I would refer them to the facts above stated, and ask of them a personal inspection. I would further add, that it is an acknowledged fact, that Mr. Ellman's flock turns out more lambs than ewes! averaging 750 lambs annually, for several years, from 600 ewes.

A strong advocate myself for purity of blood, and a known line of ancestry, which confers excellence by descent, still, I believe, for this country, the most valuable description of sheep may be raised by judiciously crossing the Merino and South Downs, thus uniting the fine fleece of the one with the beautiful carcass of the other, and gaining at once a constitution suited to our climate. This was done some years since, on the introduction of the Merinos into England, and was attended by the most flattering success, the flock beating every other for the combined excellence of wool and carcass. Both these breeds being fine, close wooled sheep, there is no extravagant dissimilarity, no wide contrasts to be amalgamated, and a more uniform character is easily obtained in the progeny, from which it will do to breed again. This is not the case with a cross between the long and short wooled varieties; the first cross will sometimes make a good animal, but when bred from again, the produce is uncertain, sometimes "taking back" on the long wooled parent, and sometimes on the opposite side; and when apparently combining in the fleece a united influence of the two breeds, a closer examination will show an unevenness of length and filament that ill suits the manufacturer.

R.

Maple Grove, Otsego, March 26, 1835.

For the Farmers' Register.

THE POLICY OF THE LAW OF ENCLOSURES DEFENDED.

Those who advocate the repeal of this law have fallen into an evident mistake, in supposing that the expense of fencing would be diminished by the proposed measure. A simple reference to the most approved method of stock management in some sections of our own, as well as in foreign countries, will be sufficient to satisfy any one that the successful prosecution of this branch of husbandry requires infinitely more fencing than is at present found in the greater part of eastern Virginia. The northern farmers, for instance, have, with a view to this subject, found it to their interest to divide their arable lands into a great number of small fields, comprising from ten to twenty acres each, separated from each other by permanent division fences. This arrangement is adopted in order to introduce the artificial grasses, by which their arable lands are made to answer the double purpose of grazing and tillage. (See Far. Reg. vol. I. p. 542.)

We find also that some of the most successful agriculturists in eastern Virginia have adopted a similar system. In answer to certain queries proposed by the committee of the Agricultural Society of Albemarle, Mr. John H. Craven states that he has five hundred acres under cultivation which are divided into ten fields of unequal sizes. This gentleman appears to be a successful raiser of stock of every description. His method of management as well as that of Messrs. Rogers and Meriwether may be seen by referring to the report of the committee. (See Far. Reg. vol. II. p. 226.)

The same system prevails in western Virginia, where it has been evidently copied from the northern practice. Even in those regions where live stock is the staple commodity, a similar practice obtains. We understand that hogs are raised in the western country by turning them upon clover lots and grain fields alternately. And even a portion of their corn crop in its succulent state is used in the same way. It is apparent that the use of division fences are absolutely necessary under such a system.

As it is the avowed object of the enemies of the fence law to contract the present amount of fencing (Far. Reg. vol. I. p. 396) it must of course be done by confining stock within as limited enclosures as possible. Take, for instance, an estate 400 acres of arable land, and let 100 be enclosed as a standing pasture. Upon this field all the stock necessary for the support of the estate are turned, hogs, horses, cattle and sheep. It is impossible to conceive the complicated disasters of such a scheme. In short, these standing pastures have been tried over and again, and as often abandoned, at least, as far as concerns the indiscriminate introduction of every sort of stock upon the same field. Those who use them at all, are compelled occasionally to turn a portion of their stock upon other fields, or upon the *woods range*—a resource of which they would of course be deprived upon the principles of the proposed plan.

It is true that great advantages would be obtained by making more enclosures; but it must be recollected that every additional pannel of fence is obviating the objection to the present law, in a geometrical ratio. For the sake of illustration, we will suppose that these 400 acres are in the shape of a square, or a parallelogram. The enclosure of 100 acres allotted to stock can be divided into three equal fields by running two division fences. It is easy to be perceived that by removing these and joining them again to the outside fence they can be made to enclose 100 acres more. Two additional fields of the same size will afford a sufficient number of rails to enclose 300 acres. And with seven, there will be enough to comprehend the whole 400 under one fence. And with this the objection would end. We have no doubt that such an arrangement of lots would be of vast importance in stock management. It would afford the means of introducing the culture of the artificial grasses, by which this branch of husbandry has been rendered infinitely more profitable than under the old standing pasture system. And we would remark that this is the plan recommended by the author of Arator, to whom the agriculture of Virginia is so much indebted.

The method of management is simply this: some of these fields will be sowed in small grain to be consumed by turning the stock upon it after it has ripened; or they may be harvested, and subsequently gleaned, as the individual thinks best. A similar system would be adopted with regard to the grass lots. Some will be mowed for winter consumption, others will be appropriated to grazing. And as these artificial grasses require two or three years to arrive at perfection, prudence will dictate the propriety not only of enlarging these lots, but of increasing their number as far as practicable.

We admit that where lands are devoted almost exclusively to the purposes of tillage (as they are undoubtedly with us) that fencing becomes a very heavy and unprofitable tax. But if it be the object of the agriculturist to make stock management a subject of profit, he becomes amply remunerated for any amount of fencing which may be thought necessary to promote this object. And here in fact is the secret of those rock fences which we hear of in some parts of the state—one mile of which would absolutely ruin a tobacco planter to build.

The idea that a portion of our arable lands were to remain unenclosed has always appeared to me as a very preposterous one. In those countries where the law of enclosures is not known, and where fencing is infinitely more expensive than with us, their arable lands are all carefully enclosed. Conceive for a moment, a country intercepted in every direction by public roads, filled constantly with travellers and way-faring men. It would be impossible under such circumstances, to determine whether depredation, upon the unprotected crops of the country were the result of accident or design. A drove of hogs or bullocks would fill the country with consternation and dismay. The adoption of such a system would indeed be a happy contrivance for the drover. It would save him the expense of feeding his stock from the time he passes the Virginia border until he sells out. When the supplies on one route have been exhausted he will take another: and when the highways have failed, he will take to the byways. And after he has thus consumed the whole growing crop of the state, he will then sell his meat at his own price, to the very people at whose expense it had been fattened.

It would be in vain to talk of legal restrictions and penalties: they would have no other effect than that of throwing the charges incident to such restrictions upon the shoulders of the buyer. Or of putting a final stop to the importation of live stock.

We insist that agricultural reform calls for no legislative enactment. The existing legal policy throws no obstruction whatever in the way of the individual who sincerely wishes to place his stock management upon a profitable footing. And we feel constrained to condemn all such attemps on the part of the legislature as gratuitous and uncalled for; and as oppressive in the extreme to the whole body of small farmers who constitute so large a portion of the agricultural community.

The foregoing remarks were suggested by an editorial essay on the law of enclosures, in the March number of the Register. We concur fully with the author in the impolicy and injustice of giving legislative preference to any particular branch of industry. But when he asserts that the law of enclosures is of this description we beg leave to put in our humble dissent. This law says he "and its effects exhibit a striking example of the long continued operation of the preference given by our law to the business of cattle-raising at the expense of grain raising—of a preference of grazing to tillage." We think that by referring to the circumstances which have given rise to these laws they will be found to have their origin in motives directly opposite to those ascribed by the author.

It is a fact familiar to every tobacco planter at least, that the annual *clearings* which he finds leisure to make, are utterly inadequate to his immediate demands. We speak advisedly when we assert, that according to the practice which prevails upon tobacco estates no planter expects to release any part of his arable land until it has been cultivated at least eight or ten years in succession. We will explain the "*modus operandi.*" And as the history of a single plantation will answer for that of every other, we will take, for instance, one of 500 acres, with a complement of ten hands. To each of these hands, the planter will assign 15 acres for annual cultivation; if he has a sufficient quantity of open land. The size of his whole crop will then be 150 acres; 20 of these are allotted to his tobacco, the remainder to his grain crop. All the newly cleared lands are invariably assigned to his tobacco, the first year they are cultivated: and where the lands are very good, they are tended in this crop at least three years in succession. This practice relieves the planter from the necessity of clearing land for his entire tobacco crop; which he cannot do, and tend a full crop of grain at the same time. Upon estates where a great portion of the lands have been opened, the annual "clearings" hardly ever exceed half an acre to the hand. But as our remarks have reference to rather an earlier period of operation, we will take it at a stage when they can accomplish at least a full acre each. At this rate then ten hands will be employed fifteen years in opening as much land as is allowed usually for annual cultivation. We have reduced the period to eight or ten years, because the three or four first years of settling a plantation are devoted almost entirely to the labor of clearing and fencing, as preparatory steps to the introduction of regular and systematic operations.

So then for the first ten years there is no open land to be spared for pasturage. By this time the fields that were first cleared are so much exhausted as to stand eminently in need of a little respite, if indeed they are not already irretrievably gone. In the mean time stock must be raised. During our earlier history the forest afforded an ample resource. Common interest dictated the propriety of enclosing all the arable land in order to secure the benefits of the *woods range.* And the legislature aimed at nothing more than to restrain the abuses to which the common worm fence of the country was liable.

But we will follow the history of the 500 acres farther, and see if there is any subsequent circumstance which can justify the inference of the author, that pasturage is preferred to tillage. We have seen that arable lands are consigned through necessity, to eight or ten years of constant cultivation. After this period, the three-field system is gradually introduced: viz. first year corn; second oats, or other small grain; third, rest, with pasturage: a system for a long time the boast of our agriculture, and the ultimate object to which the efforts of the planter were directed with the most anxious solicitude. It was indeed found eminently serviceable to stock raising, but it was ultimately discovered that lands deteriorated almost as fast under this system as they did from annual cultivation. Many planters, especially those upon thin lands, were therefore induced to relieve their lands altogether from the hoof, and to devote them exclusively to the purposes of tillage. And as a security against the temptation to pasturage whilst cross fences existed, they were removed, and the rails appropriated to strengthening the outward enclosure. A number of planters however still persist in the three-field system. Others again have established standing pastures. But under every system yet adopted in the tobacco region, there is some radical defect which compels the planter to resort to the importation of live stock to supply deficiencies. This is a succinct but true history of agricultural operations, wherever at least the tobacco culture has been introduced. And we discover in every circumstance connected with the subject a palpable preference of tillage to pasturage.

But there is another circumstance which goes most forcibly to strengthen this conclusion. Wherever lands are cheap, and agricultural products high, the people are disposed from principles of obvious economy to apply their labor almost exclusively to tillage. The enormous sums which the planters once received for their tobacco crops did for a time justify the neglect of every other subject of husbandry. It was indeed ripping up the goose for the golden eggs, but it was with a success the reverse of that which happened to the man in the fable. We may mourn as much as we please over our impoverished inheritance, but had our ancestors been so prudent as to have saved even a tithe of what they made by this land destroying system, we should have little cause to shed tears over their steril fields. In connection with this subject, we will advert to a capital mistake into which they very generally fell. The majority of people in every country either live up to their incomes, or beyond them. But the Virginia planter who consumed annually the proceeds of his crop had the misfortune to mistake a part of his capital for his legitimate income. But to such however, there were innumerable exceptions. Wherever the planter was actuated by prudent foresight, or love of money, his descendants have had no occasion to complain of barren fields or empty coffers. Indeed the wealthiest planters have invariably been those who have sacrificed every thing for tobacco, and left ruin and desolation in their rear.

It is true that the author speaks of the preference of grazing to tillage as a legal one. But he leaves us altogether in the dark whether he considers it as the joint voice of the people expressed through their representatives—or whether like the "Mesta" of Spain it has been the result of a spirit of monopoly and arbitrary legislation. The examples however with which he has thought proper to illustrate the subject, leave us to infer that he looks upon the law of enclosures in the light of the arbitrary edicts of a Spanish monarch.

In Great Britain and Spain as well as in all other European countries, the people are found divided into a great many powerful interests. And according as one or the other of these interests acquire the ascendancy in the national councils, the opposite one must suffer the effects of a selfish policy. But in Virginia we know no such distinctions. We combine in one character that of farmer, grazier, planter and manufacturer. And how the legislature could separate the grazing interest from the planting, we are unable to discover. The members of the Virginia legislature are chosen almost entirely by the agricultural interest. It is not reasonable to suppose that a body so constituted would have persisted in a system of local policy which daily experience proved to be inadequate to the object proposed.

Nor can the law of enclosures be regarded as an attempt on the part of the legislature to direct a portion of the labor of the state into a channel which would obviate the necessity of importing live stock—because this law had its origin at a period many years anterior to the establishment of the western states, to whom we now look for supplies of this article of consumption.

FENCEMORE.

REMARKS.

It is not the usage of this journal to bring forward in appended comments, editorial opinions, in opposition to any of different character maintained by correspondents—and though a more frequent resort to such comments has been more than once called for, it is still deemed most proper to leave every contributor free to speak, and every reader to judge for himself, of the various opinions and questionable points discussed. Whenever we have expressed objections to particular opinions, we hope that there appeared good cause for the exception, and that there was nothing in the remarks either disrespectful, or annoying to the particular correspondent. The adoption of a different course (although sanctioned by very general usage) gives an advantage to an editor, in controversy, to which he has no just claim: and still greater is this advantage made, when (as is also very common) a correspondent's argument is answered, or opposed, in *preliminary* editorial remarks.

Under the guidance of these general views, we should have submitted to the public the foregoing communication, without any accompaniment of our opposite opinions, and should have been the more inclined to pay that silent respect in this case, not only because the author well deserves respect, but also, because it is the first argument offered here in support of his side of the question, and therefore he is especially entitled to a clear field and "fair play." But as the writer has directed his strictures particularly to an editorial article, proper respect for him requires that we should depart from our usual course. Still it is not intended to discuss the general question.

There would be but little difference between our opinions as to the propriety of preserving the general principle of the law of enclosures in every such region as our correspondent describes, and which agrees very nearly with the general condition of Virginia in early times. No opponent of the law has objected to its early operation, nor to its continuance for any length of time that the same general state of things may continue in existence. The admission of the former good policy of the law was distinctly stated in one of the earliest arguments on this subject in Vol. 1. p. 396, signed "*Suum Cuique*," and such we presume are the views of all. This removes all ground of controversy as to any region just emerging from the forest state; and therefore no farther observations on this head are needed.

But even for the cleared and impoverished portions of Virginia, (embracing, with some exceptions, most of the middle and low country,) our correspondent thinks the change of principle in the law would be improper, and that even if made, more fencing would be required by good stock husbandry than is now maintained. This part of the question we are in no manner required to discuss—and therefore shall pass it by, except to notice one or two mistakes, or omissions, which serve as part of the grounds from which our correspondent's conclusions are deduced.

It is readily admitted that a very high state of culture combined with grazing, and on very rich lands, requires, for its *perfection*, numerous and good enclosures. This is one of the last steps in agricultural improvement—agreeing, in results, (from our then peculiar circumstances,) with the earliest and rudest state of tillage in Virginia. But to arrive at this *perfect condition*, embracing enclosures of every field, it is necessary that the durable materials for fencing should be sufficiently cheap—that the landmarks on which to build walls, or plant live hedges, should not be changed in every generation, or oftener—and above all, that the profits derived from grazing should be sufficient to compensate amply the additional expense of enclosures. None of these circumstances exist in our naked and poor country—and the whole rent of the country, taking rich and poor land together, would not pay for keeping it enclosed in 20 acre lots, as may be good policy in England, and even in some parts of the northern states. But as to the latter, (at least so far as we are informed,) it should be remembered that hogs are not permitted to range at large—and the fences may therefore be made at half the cost. A fence of three rails at most, in mortised posts, is ample protection against cattle—and fewer will serve with a ditch and bank. If hogs were thus confined in Virginia, half the oppression of the present law would be at once removed—and besides gaining that benefit, there would be more hogs raised in consequence of this restraint. We even suspect that our correspondent and his neighbors, abundantly as they are supplied with woods' range, would make more pork, and have less need to rely on the supplies of meat from western drovers, which he seems to admit to be now required.

But between the forest state of a young country, and the highest state of improvement of an old one, there is an immense middle ground, in which enclosures of every field, and even of every distinct property, cannot be profitably kept up—and therefore, in most countries, are wisely dispensed with. That is, the owners are secured against trespasses, and therefore are free to enclose, or not, as they please. Most of the arable land on the continent of Europe is still in this unenclosed state—and almost all of that which is not more productive than the average of eastern Virginia. Even much of the richest and best cultivated land is unenclosed, because divided into such small shares that a fence around each would be too heavy an expense to be borne. And though we will not here argue the question as to the superior share of benefit which the small or the large landholders enjoy in the law of enclosures, we will observe, that so long as that law may exist, it will be impossible for land to be held in Virginia in very small shares. The law is perpetually operating to starve out, deprive of their little freeholds, and to banish from Virginia, the valuable class of small farmers whom it is averred the system protects. It is as much the operation of the fence law to accumulate many small tracts in few hands, as it is of the law of descents (however beneficial this may be in general,) to divide these accumulations: and from the frequent changes caused by the two opposite operations, dividing landmarks, (whether between large or small farms,) cannot be expected to remain long enough to mature a live fence on, or to permit a clear profit from its being raised to be derived.

As applicable to this branch of the subject, we will take the liberty of copying some sentences of a private letter written last winter by a very intelligent gentleman, than whom, no individual would be deemed better authority—and who, in addition, is a resident cultivator of the tobacco region of Virginia, and where, it is believed, that the mode of tillage, habits, and other circumstances, either are, or were but recently, precisely similar to those in the neighborhood of our opponent. "You are right," says this gentleman, "in saying but little can be done in the way of improvement, till there is a change in our law of enclosures. The present law is dissected in a masterly manner in the Register, [No. 6,] and its absurdity completely exposed."———"You never said a truer thing, than that the poorer class was more interested in a change, than the more wealthy. There are hardly as many freeholds now as there were thirty years ago, and I verily believe that it is attributable to the present law. Small freeholds are amalgamated, brought under one fence and one owner."———"In my neighborhood there is thirty miles of fencing, and all to give to stock the benefit of promenading up and down a six-mile lane, where there is scarcely a blade of grass."

Having admitted fully the good design and policy of our law of enclosures, for the condition of the country when it was enacted, it will be unnecessary to disavow the intention of charging the present oppression to designedly partial, or worse than partial legislation. We spoke of the *operation* of the law, and not of the *intentions* of the legislators who enacted it. We never supposed that there was a deliberate design to sacrifice, or even to impair, the interests of tillage for the benefit of the interests of grazing, as a matter of general policy. But this effect is not the less produced because of its not having been intended—though (as formerly stated) without even the poor gain of benefiting the favored interest.

But however much we may differ from our esteemed correspondent on this question, we are pleased that he has come forward to maintain his opinions. It is proper that every question affecting the interests of agriculture should be fairly discussed in this journal—and none of its readers ought to object to a full expression of any honest opinion, however opposed to their own conviction.

From the Petersburg Intelligencer.

COTTON SEED OIL.

The Mayor and City Council of New Orleans have resolved to light the city with cotton seed oil. The Baltimore Patriot remarks "that the extensive experiment that is about to be made of the utility of this oil in New Orleans, will test its value, and if it should be found to possess the advantages ascribed to it, over the oil now in common use, it will, no doubt, enter largely into the consumption of every family, an prove an immense source of profit to the cotton growing portion of our country. It will in fact, be an addition, to the full amount of the oil, to their wealth, the cotton seed being now almost a useless article."

From the New England Farmer.

IMPORTANT FACTS TO BE OBSERVED IN REARING STOCK.

Mr. Editor—I have never seen in your work an account of M. Giron's experiments, which have brought forward some new and highly important laws, that regulate the form and sex of animals. A brief notice of them will be useful to all who are interested in improving stock.

M. Giron de Busareingues is an agriculturist in the south of France. His work contains two separate propositions, supported by experiments most numerous and satisfactory. The first is—that in animals of mature age and perfect developement, the influence of the sexes on the external form *crosses* in generation, the male being more like the dam, and the female progeny more like the sire. The second is—that in regard to sex itself, the influence is *direct*, the sex of the progeny corresponding with that of the parent which had the strongest constitution, and was in soundest health at the time of union.

The first of these propositions is deduced from an observation of a vast number of cases which cannot be detailed in this brief notice. After remarking then that they are sufficiently strong to convince every one of the correctness of the inference, I will proceed to state a few facts by which this second proposition is supported by M. Giron.

His first remark was, that, in his flocks and studs, those females who were at the most vigorous age, generally produced females whether united to strong or weak subjects: whilst those females that had either not attained, or had passed the prime of life, produced males when united to prime subjects, and females, when united to very old males. To ascertain whether this discovery corresponded with general observation among practical farmers, M. G. made inquiries of the neighboring agriculturists, who informed him that they had constantly remarked that when the male was young, and the female vigorous, the product of their union was female; while the contrary had as uniformly happened when the conditions were reversed.

In order to test this matter still further, M. G. announced, in 1825, to the agricultural meeting of Severac, that a part of his flock, already marked, would give him, at the next *agnelage*, more females than males. The society nominated two commissioners to ascertain the fact, and it turned out that the proportion of males to females was 1000 to 1472.

At a subsequent meeting M. G. offered to effect the production of a majority of males or females in a given flock, at the choice of the society. Two flocks were immediately furnished by members of the society.

The first flock was divided into two equal parts without reference to age or constitution. The first part being supplied with very young rams gave a product of 30 males to 76 females: the second part being supplied with strong and vigorous rams four or five years old, gave a product of 55 males to 31 females.

The second flock was also divided into two sections, but with more regard to the other conditions referred to. The first section composed of strong sheep four or five years old, was sent into rich pasturage and visited by yearling rams; it produced 15 males and 25 females. The second sections, composed of feeble sheep under four and over five years of age, was placed in dry pasturage, and received two strong rams over three years old; the result was 26 males and 14 females. In both experiments it was observed that the lambs produced by the young rams were equal in appearance to those produced by the most vigorous.

The experiments were continued on other classes of animals, birds and insects, with the same results. In the poultry yard, e. g. where the preponderance of maturity and vigor was on the part of the hen, there resulted 725 males and 1000 females: and where the male parent was most vigorous and of ripest age, there resulted 1415 males and 1000 females. Among horses his experiments were particularly clear and conclusive.

It happened to be most profitable to M. G. to have more females than males. With a view to this effect he took care, in the year 1824, to furnish his mares good pasturage, and to give none to foal who had suckled the same year or borne the year previous. "Elles ne furent presentées à l'étalon qu'apres qu'elles eurent donné des signes de chaleur." Five mares, thus prepared, produced five females; and of fifteen foals procured from 1824 to 1827 there were 13 females and two males. In accordance with the same law, it is generally true, I believe, that southern horses (particularly Arabian) produce most female colts when united to the more vigorous mares of a northern clime.

So far as M. G. extends his comments to the human race, they are not within the design of this brief communication, which is intended for the practical benefit of farmers. This benefit may be easily and plainly deducible from the above statements so far as they relate to horses and poultry. Permit me to allude to the manner in which advantage may be taken of *both propositions* in rearing *horned cattle*.

Suppose you have a cow that is a remarkable milker, and wish to procure from her a progeny with the same excellence. Now the *common* way is, to send the cow to bull, and if she has a *heifer* calf, it is raised with high expectations, and the owner is invariably disappointed. The reason of this is, as we now see, that the heifer calf partakes of the external form and peculiar properties of the bull and not of the cow. Proceeding then on the principle developed by M. G. we should do as follows: send the cow whose properties you value to a bull of the ripest age and greatest vigor. The product will be a *bull-calf* having the form and inherent properties of the mother, so far modified in their developements as the difference of sex required, but still inherently the same. This bull-calf should be carefully reared, and his female progeny will exhibit the form and properties of *his dam.*

So also if you have a bull of huge size, fine form, great strength, and other excellences, it will be in vain to expect similar form and properties in his immediate male progeny. But his heifer-calves will inherit his properties, and transmit them to their male progeny. Thus must we be content to pass through one generation, and we shall probably be well rewarded for our patience and perseverance.

It is scarcely necessary to add that such patience is not necessary in rearing horses. If you wish to procure a colt of form and properties of a fine mare, send her to a vigorous horse, and the result will probably be a male, possessing the properties and form of the dam. On the other hand, if you wish a colt resembling a celebrated stud horse, you must send such a mare (either old or very young) as will be most likely to have, from this union, a female foal, for it is in this crossing of sexes we get the external form and properties we desire.

In conclusion allow me to express the opinion that the incredulity that exists among farmers about the possibility of propagating the qualities of animals, may arise from their want of knowledge of these laws. "I don't believe in your breeds of horses," says Farmer A. "There's my neighbor B. has as fine an animal as ever stepped, that came of his old black mare that's not worth a pin." Now if farmer A. had known as much as I wish to teach him by this paper, the fact he stated would not have led him to his skeptical conclusion. If the fine young animal was a female, it matters little what were the qualities of the "old black mare," the foal partook of the form and qualities of the sire, and so on.

Yours &c.

B. C.

From the Cultivator.

DRYING GREEN CORN FOR WINTER USE.

Several methods of drying unripe corn for winter use are recommended and may be practised with advantage. Probably the worst of these is the common one of boiling, and afterwards cutting the grain from the cob. The corn is not only deprived of much of its sweetness and flavor by the boiling, but the best, though not the largest part of the kernel, the corculum, or as it is called by the farmers, chit, is left on the cob. A far better plan is that adopted by the Indians of Lake Michigan, who roast corn in a sand bath heated by a fire which they make on a bed of soft sand, into which the ears are plunged. After being roasted in this way, it is removed from the cob and kept in sacks for winter use.

A neater and still better method is, to put the ears of green corn into a baker, or oven of any kind, and roast them about as much as you would do for immediate use. The corn is then shelled, and spread to dry for a few days, either in the open air or a dry room; and may be kept for years. When thoroughly boiled (for at least 12 hours) it is as tender and soft as green corn, to which in flavor it is in no way inferior, and constitutes a most admirable ingredient in soups, or if eaten by itself is one of the most delicious and wholesome dishes that can possibly be prepared.

EDWIN JAMES.

From the Boston Transcript.

TRANSPLANTING A LARGE TREE.

The jingo tree which grew on the estate of the late Gardner Greene, and of which we spoke the other day, has been safely removed to the common, where it is to be planted. It is probably the largest tree ever transplanted in this vicinity, being 40 feet high, and the circumference, at 3½ feet from the ground, four feet four inches. The labor of transplanting it was undertaken by Mr. Sheridan, formerly gardener on the estate. The earth was carefully removed from the roots and the tree lifted by shears and tackle from the ground, sufficiently high to pass under it a low wheeled drag. The roots were then carefully covered with matting, and the tree lowered upon the drag, on which it was easily supported in an upright position, being kept from falling by ropes attached to the top and held by men who walked along with it to its destination. Mr. Sheridan tells us that there is not the slightest doubt that it will live and flourish in its new location.

From the Genesee Farmer.

MANGEL WURTZEL OR FIELD BEET.

A few remarks on the culture of this crop, now the season has arrived for commencing it, may not be unacceptable.

The soil

Is best when a clayey loam; but any soil if ploughed deep and well manured will produce good crops, as the principal requisite is depth and fertility.

The sowing

Should be done in the early part of the present month, although it is frequently performed later. Where the ground is very moist it should be sown upon ridges; but in ordinary cases, it succeeds best when planted in drills without ridging. T. and H. Little, of Newbury, Massachusetts, who raised upwards of thirty-three tons to one acre, prepared the ground and sowed in the following manner:—after one deep ploughing, the ground was furrowed two and a half feet apart, and the manure put into the furrows, and covered with the plough; a roller was then passed on the top of the ridge thus formed, to pulverize the lumps, level the surface, and press the soil and manure together. The seed were then dibbled with the finger over the manure, about six or eight inches apart. John Hare Powel sowed his crop thus:—"the holes for the seeds were made by a wheel, containing pegs in its circumference, which penetrated the ground about an inch, leaving intervals of four inches; the rows were made two feet asunder; two capsules [or berries] were dropped in each hole; the wheel of a common barrow was then passed over them, thus compressing the earth, and leaving a slight rut for the retention of moisture."

The quantity of seed

Per acre should be about four pounds; for although this is a large allowance, the expense is small when compared with the insurance of an even crop. Great care should be taken that the seed of the common red and white beet is not mixed with it. Unless the ground be very moist, the seed, before sowing, should be soaked about 48 hours in soft water. After the plants have come up, they should be thinned to about eight inches distance from each other in the rows.

The after culture

Consists principally in a free use of the cultivator, and in keeping the land perfectly clear of weeds. Col. Powel ascribes his success in the culture of this crop, to deep and thorough ploughing; to the use of cultivators, which complete the production of fine tilth; to the destruction of weeds on their first appearance; to leaving the smallest space upon which a horse can walk between the rows; and above all, *to planting the seeds of a proper kind upon a surface which is kept perfectly flat.* Gideon B. Smith of Baltimore, in 1832, planted one-sixth of an acre which had been intended for early corn, and had been manured the previous year. The seed were sown in drills two feet asunder, and eight inches apart in the drills, and covered as corn. When the plants were up, a weeding hoe was passed over the field, and afterwards a small plough run through it twice, clearing out the weeds with a hoe. This was all the cultivation it had; and the whole labor, including the original preparation of the ground, did not exceed two full days' work for one man. The crop was upwards of seventy-five bushels; and might have been much larger, as there were many vacant places of six or eight feet length in the rows; and other places where the roots were injured by being crowded. The soil was a fair medium mould, a mixture of clay, sand, and vegetable matter.*

The produce per acre,

Under ordinary culture, may be estimated at from six hundred to a thousand bushels. Where however the ground is ploughed very deep, well manured, and well cultivated, much larger crops have been obtained, of which a few instances are here given.

Gideon Foster, of Charleston, Middlesex county, Massachusetts, raised forty-three tons to the acre.

The premium crop of Tristram and Henry Little of Newbury, Mass., was 33 tons, 10 cwt. and 14 lbs. to an acre, or *more than fourteen hundred bushels.*

Col. Powel enclosed certificates to the president of the Pennsylvania Agricultural Society, showing that *sixteen hundred and thirty-four bushels* of mangel wurtzel, weighing seventy-eight thousand four hundred and forty-eight pounds, were produced upon an acre and fourteen perches; and a part of the same field containing thirteen contiguous rows, produced at the rate of *two thousand and sixty-five bushels per acre,* weighing 44 tons, five cwt. and 27 lbs.

Henry Thompson of Baltimore, raised in 1833, on less than one-eleventh of an acre, five tons, 14 cwt. and three qrs., or at the rate of about *sixty tons to the acre.*

In good land, single roots of the mangel wurtzel often weigh nine or ten pounds, and sometimes even *fourteen or fifteen pounds each;* and J. A. Kenrick of Newtown, Mass., raised in 1833, a single root weighing no less than *thirty-six pounds.*†

These products are enough to show what may yet be done in the cultivation of this crop, and present strong encouragement for the enterprize and experiment of farmers of western New York, where it has hitherto received comparatively but little attention.

* Amer. Far. vol. XV. p. 25.

† New England Farmer.

Uses.

This root is admirably adapted for feeding nearly all domestic animals. It is the best of known food for store swine; and swine fatten upon it, yielding firm pork of good flavor, when fed to them raw, equally well as upon boiled potatoes, by which the fuel and labor of boiling is saved. Col. Powel says, "my neat cattle prefer mangel wurtzel to any other root which I have offered to them. I have found its effects in producing large secretions of *good* milk, very great. * * * Its application as food for sheep is not the least important of its uses. Ewes yean usually at the season when grass cannot be supplied. The health of themselves and the thrift of their lambs, essentially depend upon succulent food being had. I am inclined to think that no small portion of the success which English breeders have met, is to be ascribed to the large stores of roots, which they always have at command."

In autumn, when the quantity of milk from cows often diminishes greatly, it may be restored by cutting the leaves of this plant and feeding them. In some instances the quantity has been doubled by this means. The leaves soon grow again, and may be cut every fortnight.* Cows fed twice a day in winter, upon 20 pounds of the roots at a time, together with four or five pounds of hay or chopped straw, will, it is asserted, give as much milk as in summer.

In some instances when fed to cattle and sheep, this root is said to have produced *scouring.* This may be owing either to the soil adhering to the roots when eaten, or to the sudden commencement of feeding on them exclusively, instead of their being mixed with a proper proportion of dry food, such as hay, meal, or chopped straw.

This crop has several important advantages in its cultivation. It is little affected by changes of the weather; suffers little from drought; thrives in most soils; is not attacked by any insect; and prepares the ground well for succeeding crops. The roots may be kept sound and fresh for eight or ten months.

Farmers who value their land, would find it greatly to their interest to direct their attention more to the cultivation of this crop. It has been found that two tons of mangel wurtzel are equal to one ton of hay for feeding milch cows; and that three tons are equal to one of hay for feeding cattle in general. Any one may readily calculate from this, how much greater a number of cattle may be supported by this means, from a given quantity of land, than by the usual mode of feeding them exclusively on grass and hay. Supposing for instance that thirty tons of mangel wurtzel are the average product per acre, then we shall have an amount from one acre alone equal to from ten to fifteen tons of hay. Now if a method should be devised for raising this amount of hay from an acre, it would excite universal attention and inquiry; but this crop, although possessing advantages not less important, is almost entirely neglected.

* It is probable however that this production of new leaves is in a greater or less degree at the expense of the root, although very large crops have been raised where this course has been pursued.

From the Journal of the Franklin Institute.

DETECTION OF ADULTERATIONS IN FLOUR.

M. Dubuc, senior, of Rouen, has applied himself with success to the detection of farinaceous mixtures in wheaten flour. The principal substances with which flour is adulterated are potato starch, a fecula; beans, barley, chalk, plaster of Paris, &c. An extract from his memoir is published in the last Bulletin of the Society of Encouragement, from which the following is taken.

There are two methods of detecting adulterated flour, mechanical and chemical. In France the adulteration is principally with potato starch, as it renders the bread whiter and heavier. If there be more than ten per cent. of potato starch, it may be detected by the naked eye, or with the aid of a magnifying glass; the fecula is whiter, the particles are angular, and reflect the rays of light, like minute crystals. To render the discovery more easy, M. Dubuc dries the suspected flour in a sand bath, at 100° to 110° of Fahrenheit; and then, with a good magnifying glass, so small an adulteration as five per cent. may easily be detected.

But if the miller has been cunning enough to grind the potato starch with the wheat, other means of detection must be had recourse to.

The first is, from the great difference between the specific gravity of wheat flour and potato starch.

The second is, that flour contains a certain per centage of *gluten*, and the starch does not contain an atom of gluten.

First method.—A vessel that will contain one pound of flour, gently pressed down, will contain a pound and a half of fecula, from these data the relative portions of flour and fecula, in any parcel of flour, may be easily ascertained very near the truth.

Second method.—The best flour contains about twenty per cent. of gluten, and, as we have stated, the starch not an atom.

Experiment.—Take five ounces of pure wheat flour, and two ounces and a half of warm water; mix and work it well for about ten minutes; the paste will be firm and elastic. Let a little warm water fall continually upon it, while you continue to knead it; by this means, all the starch and saccharine mucilage will be extracted. The operation is finished when the water flowing from it ceases to be white; what remains is gluten, the weight of which will be about one ounce. If the flour be adulterated, the paste will be more liquid, less cohesive, and less elastic, and an intelligent baker will soon be able to discover to what extent the flour has been adulterated, from the appearance of the paste, &c.

Such are the mechanical means that may be employed with success.

Employment of chemical agents to discover frauds in flour.—It will be well to bear in mind, that wheat flour is an animalized azotic matter, (*matiere animalise azotée*,) and that, on the contrary, fecula, or the starch extracted, pure from cereals, is entirely of a vegetable nature: from this difference results the varied effects of the re-agents employed.

The three chemical tests which have been found best for general use, are nitric and muriatic acid, and the liquid nitrate of mercury, (*deuto nitrate.*) Their chemical effects on flour and fecula are as follows:—

1. Nitric acid has the property of coloring wheat flour of a fine orange yellow, whereas it neither affects the color of fecula nor starch.

2. Pure muriatic acid colors good wheat flour of a deep violet, but dissolves fecula and starch, and forms with it a light, colorless, viscous fluid, decomposable by alkalies.

Experiments with nitric acid of 40°.—Take 100 grains of pure wheat flour, pour on it 100 grains of nitric acid, (aqua fortis,) in a small earthen or China cup, stirring it with a glass tube, it will heat a little, and in a few hours it will change color from yellow to a fine orange color.

Take 100 grains of fecula, and pour on it 100 grains of nitric acid; heat it in every respect the same as above, but no caloric will be evolved, and the mixture will not change color.

Take of flour 80 grains, and of fecula 20 grains, and of acid 100 grains; mix well; the color will now be much paler, and of a light citron color. Take 50 grains of flour, and 50 grains of fecula, and 100 grains of acid; mix well; the color is now much paler than before, so that, with a little practice, the quantity of fecula may be detected by the greater or less intensity of colors.

Experiments with muriatic acid of 21° *of strength.*—Take of wheat flour and acid, each 100 grains; mix well; the color will become at first red, then violet, and finish by becoming of a beautiful indigo color. This operation is accelerated if a gentle heat be applied.

Take 100 grains of fecula, and 100 grains of acid; the mixture is at first of the consistency of paste, and then becomes liquid; the fecula is dissolved, and the solution *colorless.*

On varying the proportions of flour and fecula, we shall soon be able to ascertain the quantity of fecula in a sample of suspected flour.

Experiment in the liquid nitrate of mercury.—Take of flour and nitrate each 100 grains; mix well with a glass tube or rod. The paste will at first be of a pale citron, then reddish, and in three hours will become a full red. The color is permanent.

Take 100 grains each of fecula and nitrate; they will not combine, nor will the color of the fecula or starch be acted upon.

By mixing flour and fecula in different proportions, and observing the colors, we may soon be able to detect the proportions in which flour is adulterated by fecula or starch.

It may also be observed, that fecula absorbs less water than flour, which affords a ready means of detection.

The adulteration with bean or pea flour may be detected by pouring boiling water upon it, which developes the peculiar smell of these two substances.

We may add, that the adulteration with chalk, or gypsum, may be detected by pouring a diluted acid on the suspected flour, as an effervescence will take place, and carbonic acid gas be disengaged.*

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* There will be no effervescence from adding acid to gypsum (if it is pure,) and therefore this as a test for gypsum, is worthless.—Ed. Far. Reg.

From the Baltimore American.

VALUABLE MARBLE.

Beautiful statuary marble, said to be of the finest texture and of snowy whiteness, has been discovered in the neighborhood of Lynchburg. In some places it runs into the *verd antique* variety: "in some specimens of the latter variety, the prevailing color is a cheerful green, agreeably blended with clouds of white so as to give it a fine flocculent appearance. Some specimens of the white variety are highly translucent."

From the Norfolk Herald.

A SWIFT STEAMER.

The new steam boat Thomas Jefferson Capt. Henderson, left here on Monday morning at six o'clock, for Richmond, with passengers, and returned in season to leave again the next morning (yesterday) at the same hour! This is the first demonstration that has been given of the practicability of going from Norfolk to Richmond and returning on the same day. * * * * The distance between Norfolk and Richmond, by water, is computed at 150 miles, and as the Thomas Jefferson stopped six hours in the 24 which intervened between her time of leaving here on Monday and Tuesday mornings she run 300 miles in 18 hours; very nearly equal to seventeen miles an hour.

ON PUTRESCENT MANURES—J. M. G. IN REPLY TO J. B.

To the Editor of the Farmers' Register.

In looking over your April No., which reached me only a few days ago, I was sorry to perceive that your well informed and estimable correspondent J. B. had not taken my jocular remarks on certain parts of his former communication in quite as good part as I hoped he would—and as I was perfectly willing to take any he might make. To this conclusion I am led from his representing them as "much ado about nothing"—"word-catching-criticism"—"jeers and flouts," &c. But these little acidulated effusions are blended with so much laudatory remark on my character, style, &c.—that I should be a great churl indeed, if I could find in my heart to retort in a similar spirit.

It seems proper however, that I should notice a few passages in his communication wherein he appears to misunderstand some parts of my former letter, and may cause others to do so; while he gives to other parts an interpretation, of which they are not, I think, fairly susceptible. For example; although he does me full justice, in ascribing to inadvertence my using the terms "*not understood*," instead of "*misunderstood*," in my quotation of his italicised sentence; yet he labors through nearly a whole page to prove that this sentence would have been quite defensible had I not made the mistake. I readily admit there is some difference in the meaning of the two terms; but cannot, for the life of me, perceive, how it can be more proper to assert that "a fact *misunderstood* is not a truth," than to say, that "a fact *not understood* is not a truth." *The truth* of a fact can never, by possibility, depend upon either circumstance, although *its utility* certainly does depend upon its being *well* understood: not so much however, on a thorough comprehension of its cause, (for of that we may be utterly ignorant,) as on a perfect acquaintance with the various methods of applying it to use. I may therefore say of our friend's hard struggle in defence of his own term, as Swift did of the contests about the merits of the two foreign musicians—

> "Strange! all this difference should be,
> 'Twixt tweedle dum and tweedle dee!"

But if J. B. is satisfied with his share of this "word-catching-criticism," as he has been pleased to style it, I am perfectly content, so far as he and I are concerned, to take my leave forever hereafter, not only of that entire class of facts which he deems "*not truths*"—but likewise of our "raw meat and vegetable" discussion—of all our little "corn-stalk chimneys," either with or without "vent," "throat," "flue," "shaft," &c.—of "Nebuchadnezzar's grazing," and, though last not least, of J. B's. own happy parallel case of "Jonah's" sojourn in the fish's belly. I am willing to go still farther, and include among these "noli me tangere" topics, whatever else *he* may deem an affair of "much ado about nothing."

A few remarks more and I have done. J. B. has misapprehended several of my observations and opinions in regard to manures—their application—their waste, &c. So far as they are theoretical, I did not presume to offer them as of any value, but merely as speculations of which others possibly might make some profitable use. Still as I *have* advanced them, it seems proper to make them plainer if I can, where it appears that they have been either "*not* understood" or "*mis*understood." As to my facts, if J. B. or any other person can make a better use of them, than I have done, they are not only welcome to do so, but I shall rejoice at their superior success: for I have no particular ambition to be either the first discoverer or the best user of any thing.

The first of my opinions which he seems to misunderstand, is that in relation to ploughed and unploughed summer cow-pens. My belief in the former proving less productive than the latter is founded—*not on the supposition* that "the earth cannot retain" all the products of fermentation really congenial to her; but that when they are ploughed under to a depth below the ordinary range of the roots of such plants as we generally cultivate, such products of fermentation *remain there*, and consequently can do no good to the roots above their reach. These, it is now believed, by all who are best acquainted with vegetable physiology, have no other means of obtaining their proper food from the earth, but by little sponge-like substances—hence called "spongioles," at the extremities of each fibre, which food must first be so diluted with water as to come in contact with and be absorbed by these spongioles. To *this* circumstance, in my opinion, is attributable the apparent difference between the produce of ploughed and unploughed summer cow-pens. According to my supposition, *all* the products of fermentation which the earth is capable of receiving and retaining, will be retained in both cases; but from pens immediately ploughed, they will be retained too low beneath the surface for feeding the roots of the cultivated plants; whereas, from unploughed cow-pens they will be carried by rain no lower than they ought to go: the first is man's process—the second that of *nature*. As to what is usually called "the waste" of manure by fermentation, my conjecture, (for it is nothing more,) is, that the atmosphere takes up all which the earth cannot take, and restores it, after proper elaboration, by its natural conductors—rain, dew, and gaseous vapor. Could the whole which is drawn up from a particular quantity of manure, return exactly to the same spot first covered by the manure, or to the growth thereof, no waste, I think, would ever be suspected. But after assuming a gaseous form and becoming an aeriform fluid, its diffusibility is so great that it spreads over a much wider extent; some portion to be absorbed by the low plants near the surface of the earth, while the rest supplies food for the leaves of the fruit and forest trees. In this reciprocation, *nothing is wasted* in any sense, but all alternately given and restored—not exactly in equal proportions between so many given square feet of earth, and an equal volume of square or cubic feet of atmosphere; but the earth, as a whole, receives back the whole of every thing which the atmosphere draws from her, and which, through her, is designed as food for her vegetable productions. These remarks are here offered as explanatory of those in my former letter, which J. B. seems to have misunderstood: but *here*, as *there* I offer them merely as conjectures.

Another of my opinions which he has evidently misconceived, and from which he, of course, draws an unsustainable inference, is in relation to the restorative power of nature in fertilizing by means of leaves and other putrescent vegetable matter, worn out lands, or in making rich those which she herself had first made poor. From what I actually did say on this subject, he erroneously concludes, that "upon my theory," (as he calls it,) such "virgin wood-land" as he supposes "I may own, or am acquainted with in lower Virginia"—of which I am sorry to say there are thousands of acres—"too poor to be worth clearing or cultivating," would become as rich in about "four thousand years, as the Mississippi bottoms, or at least, as rich as it is possible for dry land to be made by putrescent manures." Now, it so happens that "*my theory*"—if he will make me the author of one, warrants no such conclusion; although—strange to say, there is a passage in his own former communication, which either does warrant it, or something that is cousin-german to it. Here it is, verbatim et literatim: "*Fortunately however, for the fertility of the earth, bountiful nature offers to the soil much more than it is deprived of by fermentation: and however great may be the losses sustained, still the gains are far greater.*" Should I not therefore have expressed myself clearly on this subject, let me make another effort to do so, lest the ingenious power of inference be brought to fix upon me theories which I have never either expressed or entertained. My belief is, that on such "virgin woodland" as J. B. describes—indeed on all virgin wood-land, the annual deposites of leaves and dead wood, do nothing more than *restore* the quantity of nutritive matter drawn from the earth by the growing trees and other plants; and that neither four thousand nor an hundred thousand years would make any of these virgin woodlands at all richer than in their original state, when first covered with wood. If this, *my* supposition, and not the theory of J. B. gives me by inference, cannot be reconciled to what he states to be "the known facts," and which I admit to be such, let it e'en travel the same road with his own dismissed sentence concerning "facts" that are not "truths."

In another place he charges me with treating "the manuring process of nature" "according to my theory" "more as a question of morals than of chemistry." If I really have done so, I must take shame to myself for being in the situation of the man who had been talking prose all his life without knowing it: for verily I cannot even conceive how a question of morals could possibly be manufactured out of such a case. But if I have unwittingly achieved this feat, I hope and trust my readers will award me due honor for it. In furtherance of this novel charge J. B. proceeds to say of himself "*I* do not treat the earth and atmosphere as "sentient and moral things;" nor do I decide by the measure of the moral wrong, or by the enormity of thus preferring against nature a "slanderous charge of grand or petty larceny" committed on the earth. *I simply refer to these facts, of the annual additions for countless ages of fertilizing matter, and that scarcely enough has been fixed in the soil to redeem it from sterility.*" As to the "*jeer*," (if he will pardon me for using his own term,) conveyed against myself in the foregoing sentence, I leave it to our readers to do what they please with it. But I beg leave to call their attention particularly to the underscored words of my quotation, and to contrast it with the sentence quoted above, from his former communication. In *that*, he positively asserts that "bountiful nature offers to the soil *much more* than it is deprived of by fermentation; and *however great may be the losses sustained, still the gains are far greater.*" In the one just given he says, "of the annual additions for countless ages of fertilizing matter," (on poor virgin woodland,) "*scarcely enough has been fixed in the soil to redeem it from sterility.*" *I* should call this a case of J. B. versus J. B., but shall leave it to *others* to designate it as they may choose.

Here ends, Mr. Editor, my attempts at explanation and acquittal. But I cannot take my leave without assuring both you and your worthy correspondent J. B. of the real esteem I feel for his talents, and character also, so far as I can infer it from his writings. I can truly affirm what I formerly said of his two communications—that I think them both interesting and valuable. Their intrinsic merit I deemed quite sufficient to secure them against being harmed, in the slightest degree, by a little jocular criticism, written in perfect good humor, and with sentiments of respect for their author. Although it is not probable that J. B. and myself shall ever again write either *at* or *to* each other, in your paper, yet it might happen. It may not therefore be amiss to say, that should it be so—as *he* seems utterly averse to every thing which even savors of a jest "in *an agricultural journal*," *I* shall endeavor to write (provided the subject be agricultural,) with as much gravity as if I were treating about the death, inhumation, and decay of human bodies, instead of the accumulation, use, and destruction of putrescent manures. A fugitive from the cave of Trophonius himself shall not surpass me in abstinence, either from laughing myself, or attempting to make others laugh: for although I myself could never perceive any good reason why a writer on almost *any* subject, should not step a little on one side, out of the beaten track, in search of a modicum of innocent mirth—seeing that there are so many more events and circumstances in the world to make weeping than laughing philosophers; yet I am perfectly willing to conform to the lawful humors of others in all matters between them and myself. Hence I will apply to our intercourse, without scruple, that favorite proverb of Sancho Panza's: "*when you are at Rome, do as they do there.*" If grave—close-to-the-point-language be the order of the day with *them*, it shall certainly be so with *me*, as far as my nature will allow me to make it so: and, like Bottom the weaver, in Shakspeare's "Midsummer Nights' Dream," I will always at least strive to be prepared, "to roar ye—an it were, as gentle as a sucking dove."

To laugh, and where few other persons perhaps, can see any good cause for it, is with me, I fear, a natural instinct; and *this*, every body knows, is hard to overcome. When therefore, provocatives fall in my way, I must either hide, or abstain from writing; otherwise the offence is almost sure to be committed, in person or in print. I call it *offence*, and I think, *properly;* for although all men enjoy the laugh of others when *with* them, yet not two probably in a thousand can even tolerate it when it is *at* them—however just and equitable this "give and take principle" certainly is. Yet with this fact constantly before me, I find myself too frequently transgressing. My only excuse—if it be any, is, that I am always perfectly willing for others to take the same liberty in this *respect* with *me* that I take with *them*. Bar ill-will, malice, and crimination of motive, and they may laugh and ridicule to their heart's content—they cannot offend me.

J. M G.

April 24*th*, 1835.

CLOSE OF THE DISCUSSION.

The foregoing communication was accompanied by a private letter from our correspondent, which stated that he did not intend to continue farther the discussion with J. B., whatever might be the reply: and as we knew that J. B. had before resolved on the like course, we thought it best that our readers should be informed on this head as well as ourselves. For this purpose, and also to guard against any improper inference being drawn as to the feelings with which either of the writers abandoned the contest, we thought it right that J. B. should have an opportunity forthwith to express to the public what we had the best reasons to know that he thought, and had before expressed on this subject, in private: and having read the foregoing, he has answered our expectations on this head in the following note.

To the Editor of the Farmers' Register.

I shall adhere strictly to my previous intention of not proceeding farther in this discussion, notwithstanding the temptation now felt to explain my meaning as to a passage of mine which your correspondent quotes, as involving contradiction. It will therefore be left to its fate. But I wish to take leave of my highly esteemed antagonist with some expression of those kind feelings which have not in the slightest degree been chilled by any thing in our controversy, and to declare to him that he is altogether mistaken in attributing any of my phrases to peevish or angry feelings having been excited. Indeed, it was really and honestly my belief, that I had avoided every thing but strictly defensive warfare—and even in that course, had not availed myself of the full extent of his invitation to make as free with him, as he had done with my piece. If then my words bore any appearance different from this opinion, it was contrary to my intention, and to the respect sincerely entertained for J. M. G. But I will say no more on this point, lest while thus offering my hand in peace, I should provoke a quarrel, like that of Sir Peter Teazle and his lady immediately after their loving reconciliation, produced by inquiring which of the two had previously given the first provocation.

Neither did I mean to express, (as J. M. G. supposes,) nor do I entertain the slightest objection to this, or any other suitable subject, being discussed in the vein of humor which J. M. G. indulges in with such good effect—and I have often joined heartily in the laugh, and not the less in the recent cases, when it was at my own expense. The objections expressed in my general remarks, were intended to be opposed to the sharpness of personal controversy—and not to the jocularity proceeding from good humor, and calculated to prevent, or allay, rather than to excite angry feelings, Long may J. M. G. indulge this vein—(of course properly directed—) and when he has—as is his usual good fortune—the "laughers on his side," I shall doubtless, be generally one of the number.

J. B.

SALE OF VIRGINIA LANDS, IN LONDON.

The following article is from the London Courier of March 26th, and is now passing through the newspapers of this country—and without comment, so far as we have yet observed.

"An important sale of freehold American lands in the state of Virginia took place on Wednesday, in the Auction Mart, which was crowded to excess with a highly respectable company. Mr. George Robins, in an able and elaborate statement, detailed the property, which was illustrated by maps and drawings. It comprehends a portion of 50,000 acres of carefully selected lands, purchased some years since under advantageous circumstances, out of 1,800,000 acres. The land is almost exempt from taxes, and the state of Virginia unencumbered by any public debt. The legislature of Virginia has recently passed an act for a rail road passing through the lands in question. The selected lands were divided into portions of various sizes from 50 to 100 and 200 acres, each of which possesses the best timber suitable for the building of houses, fences, ect. The yearly average produce of an acre of land giving from 60 to 72 bushels of Indian corn, is net in cash from £1 2s. to £1 5s.; and varying in quality from 40 to 50 bushels, from 16s. to 17s 6d. The tobacco crops are very productive. The country abounds in iron, lead, and coal mines, and Mr. Robins urged the important benefits to be derived from purchasing largely in this "the land of promise." The tiths and poor rates, were unknown in Virginia; wages were comparatively nothing. Upon a farm of 600 acres, the taxes did not exceed six shillings. The fee simple of one hundred acres of the best quality of land, which in this country would consume £5000 or £6000 might at this sale be obtained for less than £300. The lands were submitted in 91 lots—the first division, 7,265 acres in the county of Logan; the second, 2,517 acres on the waters of the Spruce Fork of Little Col River. The first parcel, containing 600 acres of land, the yearly average of taxes upon which is about 5s a year, was knocked down for 1,450 guineas. The above lot may serve as a criterion for the whole of the 47 that were submitted. The lots unsold, Mr. Robins said, were open to private contract, amounting to about five thousand acres in various farms, from 50 acres to 500 each, and will be sold by auction in London, on 15th April, in case any of them remain unsold."

It is certainly *possible*, that land as productive and valuable as that described above, and even in the county of Logan, may have been offered for sale across the Atlantic, where its worth could only be learned from the interested description of the proprietor, and the proverbial and licensed exaggerations of a land auctioneer. But it is at least highly improbable that any good land should be offered for sale under such circumstances. Land worth purchasing would naturally be offered to those who knew something of its value. The mere general statement of this transaction gives good ground to suspect that the "favorable circumstances" under which these lands were purchased, were, that they formed part of the millions of acres (real and imaginary) that have been sold by law in Virginia, for payment of taxes due thereon, according to the tax lists—and of which the greater part, if sold at a cent an acre, proved a dear bargain; but which more often, found no bidders at any price. In many cases, such delinquent lands had no existence, save on the books of the commissioners of the revenue—or if really existing, and even so well known that the purchaser will have no difficulty in finding them, consist of barren mountains, willingly perhaps forfeited by former owners, because not worth paying any tax on whatever. If this should be the result as to the buyers in this case, they will not be the first Europeans who have been thus duped, and thereby ruined—who have come to this "land of promise," believing themselves already rich, and found themselves paupers.

If there was no other objection than thus giving ground for such frauds, where our laws and usages are not known, it would be enough, for the sake of national character, to guard against the recurrence of such modes of collecting (or attempting to collect) the arrears of land taxes. It is true, that except poor foreigners, (who cannot understand that a deed executed for 5000 acres of land, by a public officer, under the commonwealth's authority, duly authenticated, and wanting in nothing of legal form, should refer to land not to be found, or held by some better right—) but few people would have been cheated by buying delinquent lands, at any price. But if there has been any benefit from the laws on this subject—any net gain to the treasury even—for all the legislation and all the complicated procedure on the subject—we are ignorant of any such results. The cost of legislation on delinquent lands, and of fees to legal officers for sales, executing and recording deeds, &c. have alone cost more than all the value of the forfeitures of land to the treasury: and where individuals have made purchases of real value, it has been often akin to fraud on the ignorant owner, and caused by the general fictitious state of these dues and sales—the vast amount of such charges, and the complication of the whole matter, —all serving to conceal the few facts among the multitude of fictions and errors.

It is not intended here to attempt the explanation of a system of measures which it is believed that very few, if any, understand, unless some public officers who have been many years engaged in executing the various laws continually superseding each other on this subject. But it may be of some use to show that it is not an intended fraud—though the result is the same—on the part of the government of Virginia, when land is sold under state authority, with every apparent security for the reality of the whole transaction, when in fact no such land can be found.

The vast accumulation, on the public lists, of land returned as indebted for tax, and finally sold by law, was not so generally caused by the tax being actually due, as by errors on the lists, which were continually added to, by the ignorance or neglect of proprietors, and the neglect, and sometimes frauds of the different officers who either listed, or collected the taxes. If A sold his land at various times, and in several parts, to B, C, and D, and then moved out of the state, each of the new purchasers had so many acres entered to himself on the tax list, without caring that A's balance was stated correctly: and if the commissioner was not very careful, and also well informed as to the transaction, when A had no balance left, and had left the state, a part, or perhaps the whole of his original tract would still stand on the list, and be returned every year delinquent for 20 years, and at last be sold by law, when in fact he had no land, and what had been his, had been regularly paid for by the owners. For this and other causes, there was an immense amount of what appeared as land on the tax lists, and which was sold by law without any other mode of designation, and for which deeds were drawn and recorded, that had no existence. The only consolation of the purchaser in such cases, was that he had ventured in a lottery and had drawn a blank—having given perhaps $10, for the chance of finding 1000 acres. But this is a very different situation from the poor duped foreigner who may be the next purchaser, and who relied on the faith of the government for the real existence of, and his indefeasible right to the land.

Within a year or two after the first and great sale of delinquent lands in Virginia, a like sale took place for taxes due to the federal government: and all the real but unproductive lands that had been sold on account of neglect of their owners, by the state, were very sure to be indebted to, and to be again sold under authority of the federal government. In this way, if the purchaser under the first sale bethought himself, after waiting some years, to go to look for his estate, he might find it held by a new owner, who had profited by *his* neglect, as *he* had done by that of the first possessor. Or if years elapse, (as often was the case) after buying an immense number of acres, before travelling to seek them, it might happen, that the original and hereditary possessor, the purchaser under the state law, and the second purchaser under the federal law, might meet, and each one only then discover for the first time that he was not the undisputed owner. But such difficulties have rarely occurred, and perhaps more than from any other reason, because the lands were found to be either in the moon, or on the mountains of Logan, or somewhere else of as little value as if forming a lunar freehold.

But under any circumstances whatever, it is very strange that Englishmen at home can be so gulled—or that any can be persuaded to purchase lands in America at any price, offered to them in London. If a protestant clergyman having a church in the wildest and most lawless part of catholic Ireland, was to offer his claims on his flock for tythes, for sale at auction in the mountains of Virginia, the seller would not give stronger evidence of desiring to sell what was worthless, and the buyer of being a credulous fool, than in the case of land in Virginia being sold in London.

REPLY TO "COMMENTATOR," ON MR. BAUER'S EXPERIMENTS ON DISEASES OF WHEAT.

To the Editor of the Farmers' Register.

Henrico, 9th May, 1835.

In noticing the comments of "Commentator" in the No. of the Register for this month [No. 12 of Vol. II.] on the papers contained in No. 9 of the Farmers' Register, it is not with the view of claiming any merit for the article on the supposed diseases of wheat, &c. over the signature of A. N. contained in that No., but to support the opinion then given of the articles on this important branch of vegetable pathology by Mr. Bauer, contained in the October No. of the Register, copied from the "Penny Magazine." I think it must appear evident to every unprejudiced reader of these articles, that Mr. B. has not only been successful in defining the several diseases therein stated, but in tracing out their true causes; and thereby has been enabled to point out a remedy. If there is nothing wonderful in these interesting experiments, they are at least of sufficient importance to arrest the attention of every farmer. Had Mr. B. merely stated the results of his several experiments, without detailing the way and manner in which they were obtained, there might have been room for continued doubt. But the known celebrity and scientific attainments of Mr. B. coupled with the patient investigation and highly satisfactory results of these complicated experiments, entitle them to very considerable credit. But the true way to test the full value or correctness of these results, and the remedy pointed out, is, for every farmer to try the remedy for himself. Lime water has longbeen used as a preventive from many diseases in wheat, &c.; and many respectable farmers who have used it, have attributed no small degree of benefit to it—but being ignorant of the causes producing these diseases, their remedy—though accidentally the true one, was not used to a sufficient extent to ensure the desired results. But, to use your own words, (in commenting on those experiments,) "these coincidences of accidental practice, with theoretical reasoning, are highly satisfactory; and though in these cases accident had discovered the remedy more early than science had made known the cause, it does not therefore, lessen the value of the latter mode of investigation." There are many farmers who have used supposed remedies for many years, and whom every years' experience must have told was of no use. To such, Mr. B's. experiments must be highly valuable.

I agree with "Commentator" that these and similar dissertations are comparatively useless, unless accompanied by some remedy. I think, however, that the result of Mr. B's. investigations alluded to, clearly points out a remedy, and as such, are of no mean importance. If the pages of every agricultural periodical were filled with dissertations of as important, practical, and decisive a character as are those of Mr. B., I have no doubt that many who are now anti-"book farmers," would be glad to avail themselves of the helps to be derived from such works. I do not think that the reading of quotations such as "Commentator" has favored your readers with, will tend to reduce the "bad odor" of "book farming;" but I do think that the reading to them some such articles as you have happily selected from Mr. B's. productions would; and by inducing them to try the remedy there pointed out, a few converts might be added to this species likewise; and perhaps, a few hundreds of the "thousands" now affected with this unpleasant odor, might be induced to add their names to your list of subscribers, and enable you shortly to carry into operation your proposed improvements on your valuable Register.

A. NICOL.

VITTORIA WHEAT, YIELDING TWO HARVESTS IN THE YEAR.

Loudon's horticultural and agricultural notices, last autumn, gave satisfactory accounts of the experiment tried in Somersetshire, of planting this valuable present made to his country by Sir Robert Kerr Porter, our Consular resident in that part of South America where it is native of the soil. Loudon reports it to have given great promise, both from its spring and summer sowing. In Warwickshire, we ourselves know that it succeeded so well as to produce a fine crop in July last year, though, by an accident, it had been planted a month too late; and it yielded a particularly sweet and well tasted flour, from which excellent bread was made. The proper times for sowing are, February (which gives its harvest in June,) and in June (which yields its harvest in October.)

DESCRIPTION OF A CHEAP WATER-LEVEL, AND THE MANNER OF USING IT.

To the Editor of the Farmers' Register.

In forwarding my annual subscription for your third volume in advance, I embrace the opportunity of tendering my respects to your correspondent M. N., who, in Vol. II. No. 9 of the Register, has added to the stock of information it has already afforded us, on the subject of hill-side ditches, and horizontal ploughing. In place of the rafter level, which is generally used for such purposes, he recommends a plumb level, as described in his communication. I suggest to M. N. as much better adapted to the purpose, a light tin water-level, which can be procured for $1. 25 in Richmond, on the street leading to Mayo's

Bridge, and probably in any other town. It would be found very useful in other operations, such as levelling the foundations for buildings, conducting races for waterworks, or in ditching and draining. It is a tin tube about three and a half feet in length, and three-fourths of an inch in diameter, closed at each end, with a socket affixed at right angles to the centre, for receiving a moveable staff, similar to a surveyor's. At each end of the tube, and communicating internally with it, are two upright tubes or sockets, two and a half inches long, of the same diameter, in each of which is inserted with rosin or some other adhesive substance, a small vial divested of its bottom, and furnished with a cork tied by a string to the neck, to stop it when filled with fluid, thus preventing its spilling when the level is moved. When the operator is to proceed to level a piece of ground, the tube should be filled through one of the vials with some fluid slightly colored; and having fixed his staff, and placed the level on it, he will uncork the vials, when the fluid in them will find a level by having a free communication through the tube, and the two uprights in which the vials are inserted. His assistant will be furnished with a ten-foot rod, graduated with feet and inches, which he will place at the head of a gully or other point where the levelling is to commence, in front of which he will place a piece of paper, which he will move up or down on the rod by direction of the leveller, until the top of the paper ranges with the top of the fluid in the vials, noting the elevation from the earth on the rod. He will then step eight or ten paces, or measure two lengths of the rod on the earth along the course proposed to conduct the levelling, and elevating it to a perpendicular, he will move it up or down hill, until the paper placed at the former elevation ranges with the top of the fluid in the vials. The leveller can, with great ease, move his level to range with the rod, by placing his thumbs on the mouths of the vials, and gently turning the socket on the staff. If it be wished to give a fall or rise of two inches in every twenty feet, it will be readily done by placing the paper two inches higher or lower on the rod, at each removal. In conducting a long level, if it becomes necessary to remove the station of the leveller, the assistant should keep his rod unmoved at his last station, and the leveller should advance beyond him to any suitable position, and sight back to him, continuing the same process as in the commencement. I would make the assistant carry on his arm a basket of small sticks, to mark each station of his rod, instead of employing an additional hand as proposed by M. N. After the line of level is run, the situation of the sticks may be altered at pleasure, so as to produce proper curves, to be followed by the ploughman, who will be accompanied by the leveller, to direct him, and pick up the sticks.

In levelling the foundation of a building, the level is fixed near to it, and the assistant places the end of his rod in a perpendicular position, at any given corner, of the desired height or depth, noting the number of feet and inches where his paper ranges with the fluid in the vials. He then places his staff at another corner, and the range of the top of the water in the vials will immediately inform him whether it be too high or too low, and by how many inches.

In levelling either up or down a stream to ascertain its fall, the assistant places his rod at the water's edge, and the leveller goes forward a convenient distance, sighting back to the rod-man, who notes the height from the water, in a column headed "*back sights.*" The rod-man then goes forward in advance of the leveller, who makes a forward sight, the height of which is also noted under a separate column, headed "*forward sights.*" The leveller then moves his station, sighting back to the rod-man, which is noted as above, who then moves forward in advance of the leveller, and so on alternately, until the levelling is completed, taking care to commence with a back sight, and end with a forward one. The back and forward sights will be equal in number, and after adding up the feet and inches, in each column separately, and deducting the smaller amount from the larger, the difference will be the amount of the fall. If the levelling be up stream, the amount of the back sights will be the larger. The reverse takes place in levelling down stream. The merest tyro in the science of engineering would probably laugh at this communication: but it may, nevertheless, be of service to somebody, in which event my purpose is fulfilled.

F. H.

May 17th, 1835.

SURFACE MANURING.

To the Editor of the Farmers' Register.

The urbanity and scientific research displayed by your correspondent W. B., in his criticisms on my remarks upon J. B's. communications, deserve a very respectful notice. He seems to possess a share of chemical knowledge to which I have no pretensions; and I shall therefore offer little more in reply, than such objections and difficulties as present themselves to my mind, in opposition to his opinions and arguments.

His first observation in regard to the hypothesis which I ventured to suggest, does not appear to me to militate against it. I was well aware of the truth which he states, that "chemical affinity only acts at insensible distances;" and that "the better the mixture of any two things having a chemical affinity, one for the other, the more rapid and perfect their combination." Now it is equally true, according to my hypothesis, that nothing which constitutes the food of plants can combine with the earth, until such substance or substances be dissolved in water. But the water will dissolve them quite as soon while lying *on*, as *under* the surface of the earth, by percolating through the manure; for in both cases this water must at an "insensible distance" from that which it dissolves. The only doubt then seems to be, whether, if the solution takes place below the surface, the food which it contains for plants will not be carried lower into the earth than it ought to be: whereas, when it is absorbed from the surface, it will go no deeper than nature intended it should. As to there being "no gas in the earth," W. B. is right in supposing I did not mean to say so, however my language—never very accurate, might have justified the inference. But my belief is, that the greater portion, if not all of those gases which constitute the food of plants, is imparted to them through their leaves, by the atmosphere, and not the earth, which does nothing more than retain the nutritious water naturally prepared for, and imbibed by the spongioles of the roots of plants. This hypothesis explains satisfactorily, at least to myself, the chief advantage of tillage, which is, that by loosening and pulverizing the earth, the rains and the dews are more intimately mixed with its particles, and therefore longer retained. The other and only advantage is, that none but the plants designed to be cultivated, will receive and share among them, the whole of the food destined for their use.

W. B. has quoted one of Sir Humphrey Davy's opinions, I presume, because he deems it opposed to the hypothesis suggested by myself. If my presumption be right, the quotation furnishes as strong an instance as any I have seen lately, to prove how marvellously men may differ about the meaning of words and sentences; for *I* understand this extract from Sir. H. Davy's Agricultural Chemistry, (so far as it goes,) as sustaining, rather than refuting my own notions. He here asserts the superiority of manure applied in a comparatively *fresh state*, to that which has undergone *much fermentation;* so do I assert it. In what then do I differ from him? Simply in believing that the surface application is better than ploughing it under. But this difference is more apparent than real; for one of his reasons in favor of ploughing under the manure is, that "the fluid matter produced is applied *instantly*, even while it is warm, to the organs of the plant." Now this can apply only to the case of plants growing at the time of the application; but in nearly all the cases which I have supposed, there would be no plants intended for our use growing in the earth, *instantly* to receive this premature supply of food. Again; Sir H. Davy's alleged reason for speedily ploughing manure under, is, that its fermentation above ground would be prevented. So it would be upon *my* supposition, at least all but that fermentation which it undergoes while losing the natural heat acquired in the bodies of the animals that produce it, and this heat it must lose during either process. By being spread on the surface, as in the case of summer cow-pens, or by carting it out as soon as practicable, without heaping, no other fermentation takes place, but that which is unavoidable. But in the other mode, which is to collect and preserve it in heaps, for a considerable time, great additional heat must be generated and continued long enough for the escape of gaseous exhalations to a great and incalculable amount.

The "medical maxim"—"assist nature," which W. B. has suggested, will not, in my humble judgement, assist his argument much: for if the want of skill in applying it be as great among the land-doctors, (and it certainly is so,) as it but too often proves to be in the human-body-doctors, the poor old dame, had she the gift of speech, would not unfrequently have to cry out—"*non tali auxilio—egeo*"—I need no such aid. Fortunately however, in many such cases, if they be not too desperate, her "*vis medicatrix*'," or recuperative power comes in and saves her from destruction. By the way, this business of *assisting nature* is a pretty bold, not to say presumptuous undertaking, let who will attempt it. In the case of an agriculturist, he should be, (if you will pardon a pun,) very sure of his ground, or, he may do much more harm than good: and should he go to acting upon the supposed analogy between his and the medical profession, he may often commit very fatal blunders. For example: "*depletion*" by two or three different modes, is quite a favorite dogma with the faculty, whereas, our mother earth is almost always much more in want of food than physic. Again; medical gentlemen deem themselves bound to invent and apply remedies for all the various diseases and "ills that flesh is heir to;" and as these appear to be innumerable, so, nearly must be the nostrums for their cure. Now the only names of human diseases that can, by any sort of imaginary analogy, be applied to the earth, are, *the gravel* and *the consumption*. The first is nature's own creation, and past all remedy—so far as it impedes vegetation, while the latter is superinduced by the ingratitude of man himself, who, if he had any sense of retributive justice, would most assiduously attempt its cure the moment he discovered any of the premonitory symptoms.

W. B. says, "we might with the same propriety scatter our seeds to the winds, and depend upon the earth, the air, and the rains, to cover, sustain, and mature them," as "to expose manure on the surface:" and *so we might*, if nature's God had not commanded that man should both sow and till the earth, that it may produce the food necessary for his subsistence, which was produced spontaneously before his fall from his primitive state. Let it be borne in mind however, that in all uninhabited countries, as far as we know any thing about them, *every* plant or tree which is propagated by seed of any kind, that grows above ground, deposites them on the surface, where the only covering they get is formed by the falling leaves or rains; but this always proves amply sufficient to continue all their orders, classes, genera, and species, as long as time shall last. I do not mention this as a reason why we should not bury at some depth in the earth, all the seeds we plant, for all men deem this essential: but merely to call W. B's. attention to the fact, that both plants and trees are abundantly perpetuated in every part of the world of which they are natives, without any such inhumation of their seed, as he seems to think indispensable. One obvious reason why we bury them, W. B. appears to have overlooked; it is, that by so doing we can much better bestow on them that cultivation which is designed to prevent any thing else from growing where they do, that they alone, (as I before remarked,) may imbibe the food intended for them.

The inference which he draws from this universal practice of covering seed in the earth being deemed necessary, is, that covering manure is also necessary. But surely this is a *non sequitur*, unless he had proved, that the food of plants contained in manure, could not be imparted to them in any other way. The woody portion of putrescent manures, if left on the surface of the earth, unquestionably requires a longer time to decay than when it is buried below the surface; but in *either situation* it *will* decay. Not until then, can water so act upon it as to dissolve such parts of it as are capable of conversion into the food of plants. The only inquiry, therefore, relevant to the case is, *when* is it best that this solution should take place—some time before the plants to be benefited by it are even so much as planted, (which must be the case with all buried manure, unless it be *that* ploughed under immediately before sowing or planting;) or, that it should take place when, according to Sir H. Davy's dictum, "the fluid matter produced is *instantly* applied, even while it is warm, to the organs of the plant?" Admitting Sir H. D. to be right, I consider the correctness of the latter opinion, to be absolutely demonstrated, so far at least as such assertion can properly be applied to *this*, or any similar subject. To this, however, as to many others, we may truly apply the scholastic adage, "*grammatici certant, et adhuc judice lis est;*" and this being the case, I am determined the present seeming controversy shall, so far as I can help it, "break no squares" between your intelligent correspondent W. B. and your old friend

J. M. G.

THE WHEAT CROP IN FAIRFAX.

To the Editor of the Farmers' Register.

I seeded 290 bushels of wheat after the following manner. Upon the 6th day of October I began to seed upon 87 acres of oat fallow, twice ploughed, which was seeded with 145½ bushels of wheat, consisting of Baltimore bearded, early red, and New York white flint. Two good harrowings put in the seed—all was completed upon the 12th. Fifty acres of this land would have brought good tobacco. The Baltimore bearded is an entire failure, the fly having scarcely left a plant. The early red may make three for one—and the white flint eight for one.

I then seeded a field of 62 acres, dry sandy land, which when enclosed some 20 years past, would produce about 2½ or 3 bushels of corn to the acre. My cattle had been fed upon it for two winters, and it had received much farm-yard litter —and since being enclosed, had received some deep three horse ploughings. Eighty-one bushels of early red was seeded in the field upon two good ploughings, the grain was harrowed in, and all done and finished upon the 20th. This field perhaps is equal to one-half a crop—say 5 or 6 bushels to the acre. The balance of my crop was seeded upon corn land, and completed upon the 6th of November; and may give 5 or 6 for one acre. After this I seeded 40 bushels of rye, which, though young, promises much better than the wheat.

My brother farmers charge the loss of their wheat upon the severity of the winter. This is not my excuse—for the winter passed over us, and left our wheat plants all standing. But nothing in my memory has equalled the destruction of the fly. We have measurably dodged this terrible enemy of late years by seeding after the 8th of October; but they are evidently not to be dodged always—but acting up to the rules of a higher or larger order of devastators, they take all * * I am casting about for a corrective, and think I shall call to my aid 100 acres of rye, which, like the democracy, will overwhelm all enemies, and though the victory will be but rye, it will be exactly that much better than nothing.

X. Y. Z.

Fairfax, May 20th, 1835.

For the Farmers' Register.

ON MAKING RICE ON DRY LAND.

In my paper on the subject of cultivating *corn*, [Far. Reg. p. 634, Vol. II.] I stated the article of *rice*, as entering into the crop. My reason in part, as you will have no doubt discovered, for introducing this article amongst others, was that it is found not to affect in any unfavorable way, the growth of the corn, &c.—and also, that I have satisfied myself, from repeated trials, that this mode of raising it, is calculated to produce that grain in the greatest perfection.

The rice cultivated throughout this state on highland, is in every respect similar to the rice plant of South Carolina. It is found to grow well in every soil we have, from the pipe clay ground of the pine woods, to the black fat limestone land of the great cane brake. In the latter, however, it excels—although from some fair trials I have seen, and indeed assisted in making, I am compelled to believe that pine land, (gray) with a good red clay foundation, moderately prepared by manuring, lime, &c., will equal in production, for quantity or quality, even the fat black land of the great cane brake. It is the most generous grain I know of—will meet successfully a greater variety of seasons and soil than any other. I know of no soil or situation perfectly unfavorable to its production, and it is never made, with our planters, any question in what land they will put it; but what spot is most convenient on the farm of the second year's land. On every species of pine land, with a little cow-penning, cotton seed manure, or any other decomposed animal or vegetable matter, it grows luxuriantly, from four to five and a half feet in height, and produces astonishing crops of grain; say from forty to one hundred bushels of shell rice, that is rice with the husk on, per acre.

The rice produced on our uplands, I am satisfied, is superior in quality to the water raised rice of Carolina—especially that which we raise on the calcareous soils. When boiled in pure water, it exhibits a most decided superiority in the glutinous over the watery principle. I could not possibly admit any comparison in the quality of the two productions. The grain of what we call the "big white," is remarkably large, both in the hull and when cleaned—although the "red bearded" is by some thought superior. Both of those kinds, with the "small white," grow well on dry upland. The operation of hulling or cleaning, is performed with the common pestle and mortar, or in our little tub mills, by partially raising the stones when they become dull and want picking. I have had it cleaned under those circumstances, as handsomely as any table would require.

It may be proper to add, that in boiling the upland rice raised in this section of country, it is found to absorb, or to make a mass at least one-eighth greater than the rice of South Carolina, or any other, where water is employed as an agent in its production.

The straw is found admirable winter forage for horses, mules, oxen, and cows; but especially for young cattle—and a prodigious mass of it is produced from an acre of land. A sheaf of rice passed through the cutting box and given daily, with her other food, to a milch cow, in the winter, is found to produce superior milk and butter. We raise it with so much ease, that we find it economy to give it to our poultry, and pigs, for both of which it is admirable, given in the hull. It is thrashed out with great ease over a bench properly placed, or a barrel.

It is the first article I plant in the spring. If planted alone, and if planted early as possible, it will be off the ground before the arrival of the *rice bird*. Like other grain, I have found it superior, when cut (if for table use,) just *before it is perfectly ripe*. In this case the straw is cured when still *green*, consequently, *highly nutritious*, and when cured still retains its color.

In cultivating this grain, the ground should be turned over in January—harrowed *with* the furrow, and the first favorable state of the *weather* and *soil* in February or March, lay the ground off in drills with a *half shovel*, for the purpose of having the seed deposited as deep as possible, so that, after it is hilled up, the roots may be *deep* in the ground, and which, in case of a *drought* about filling time, will secure it. This last precaution has been the result with me of several experiments. The drills may be as near as eighteen inches apart, if the rice is cultivated alone, and it can be covered with a small board fixed to a scooter plough stalk, or with the hoe or rake. The first is the most expeditious, and requires no other attention than to cover shallow. When six to nine inches in height, plough with a scooter between the rows with a small pony or mule, and finish it off with the hoe, drawing the dirt to it. If the land is light and loose, one ploughing is sufficient—keeping the ground loose and clean is all that is required. It is cut with the sickle, in dry, hot weather, and put up in sheaves the next day, and stacked or housed.

I have had it cut down with the frost twice in the spring, without any bad consequences. I planted once in the *twelve* days, and made a fine crop, remarkable for weight. It was cut down by frost twice; I was making experiments to defeat the *rice bird*, but found that planting in February, or even March, and cutting as before stated, will always find the crop in the barn on his arrival.

I am assured that you will find no difficulty in raising this valuable grain in your vicinity. All difficulty as regards preparing it for table use, is done away, by substituting the wooden block in lieu of the stone—the first being furrowed out in the same manner. Attached to a small horse mill, for my own grinding, I have four pestles, worked in as many mortars, that would clean for a whole neighborhood.

Where I have ground to put in corn of the second year after being cleared, and especially if I can afford a little manure to the land, I would always raise my rice as before stated, with the corn. When the land is not disposed to produce grass, it is made with less labor, for the production, than any crop I know of.

AGRICOLA.

Alabama, March 15, 1835.

SEASON AND STATE OF CROPS DURING MAY—PROSPECTS.

Cold weather has continued to predominate generally through this month, though intermixed in the latter half with some very warm. The corn crops are very backward, and look badly. To cotton, in this region, the cold weather has been still more injurious. But the great loss of Virginia will be in the wheat crop. The Hessian fly has seized on it every where that we have heard from in the state, (probably in consequence of the feeble state of the plants,) and promises to destroy half the remnant that the severity of the winter had spared. The few crops which have come under our personal observation, cannot yield more than half of what might have been expected in a good season—and accounts equally unfavorable—some much more so—have been received in the incidental notices of correspondents from every region of the state where wheat is an important crop. After making due allowance for the fears of writers being heightened beyond the actual and abundant grounds for despondency, it can scarcely be expected that more than half a crop of wheat will be made. A few extracts from private letters will show the kind of information upon which our opinion is founded.

From Goochland, May 19. "Our wheat crops are deplorably bad on James River—the best low grounds even worse than the high lands. I shall now be content with one-third of a crop. The fly has been committing sad ravages for the last ten days; and at the proper time we may anticipate rust. The corn, so far, does not stand very well—and tobacco plants small for the season, and not very abundant; so that really our prospects are gloomy. The oats and clover alone promise well."

A correspondent from the same county, (near Johnson's Springs,) writes (May 18th,) as follows: "The growing crop of wheat is offered by many of my neighbors for the seed sown, and in some cases less. I hope the fatality has not been very extensive, and that other regions may be blest if we are destitute."

Another from King and Queen (May 10th) speaking on another subject, incidentally remarks: "I should like to submit to you and your correspondents, a few inquiries as to the best mode of seeding wheat to prevent its being killed by frost, for my crop, although put in with some care, is an entire failure."

From Fairfax, May 7th. "You may report with safety that not more than a third of a crop of wheat will be made in this county."

From Fauquier an account equally bad was received, but of earlier date. Of the crops of the great wheat growing county, Frederick, something has been stated in the communication (p. 30,) of a "Frederick Farmer"—and a still more desponding view has been given in a private letter from another farmer of that county, dated May 9th.

The bad state of the wheat crop, added to the high price of cotton, (and perhaps also the rising rage for speculation in general,) have combined to give a new impulse to the emigration of the farmers of this state to the South West—and thereby to increase the drain, always flowing from the heart's blood and vital power of Virginia. No country can prosper while continuing to lose annually so much of its accumulated wealth, and so many of its most energetic and useful citizens. It is necessary for those who remain—who will "die in the last ditch" before they will abandon their native land—to use every exertion to aid the general improvement and prosperity of agriculture, as the only means to arrest general ruin—and this end is not more called for by patriotism, than by sound calculations of private and pecuniary interest. *Our* individual share of this general effort recommended, is making through the Farmers' Register—and even that seems likely to be cramped and weakened by the present prospects, and extent of emigration. But this effort will not on our part be relaxed, while its continuance is encouraged by public favor—and if that should cease—this work will at least serve as *our "last ditch,"* in which to die, so far as it relates to service to, or connexion with the public.

From Malte Brun's Geography.

PHENOMENON OF THE BLACK WATERS.

In the upper part of the region of this river (the Oronoke, in South America,) between the third and fourth north parallels (of latitude,) nature has several times displayed the singular phenomenon of what has been named Black Waters. The waters of the Atabaco, Temi, Tuamani, and Guainia, are of a coffee color. Under the shade of the woods of the palm tree their color becomes of a deep black, but in transparent vessels it becomes of a golden yellow color; the images of the southern constellations are reflected in it with singular brilliancy. The absence of crocodiles and of fish, a greater degree of coolness, a smaller number of musquitoes, a healthier air, distinguish the region of the black rivers. They probably derive their color from a solution of carburet of hydrogen, resulting from the decomposition of the multitudes of plants that cover the soil through which they flow.

[The appearance described above is always found in the waters of many sluggish streams, and of mill-ponds or swamps, in lower Virginia. Blackwater Swamp, and its branches, and the lake and canal of the Dismal Swamp, are well known, and remarkable examples. We are not able to appreciate properly the supposition above of the cause of this coloring. But we had before attributed this effect simply to the solution, or suspension in the water, of vegetable extract derived from the vast quantity of fallen leaves and other vegetable substances, over or among which the water flows. The same tinge is often seen in the smallest pools of recent rain water, after standing a short time on poor woodland. So far as our observation has extended, these colored waters are never found, either flowing or standing, over calcareous soil, or where any notable amount of lime in any form is present in the soil; though such soils may be most abundantly supplied with vegetable matters, which yield their extract to every soaking rain. These different circumstances have appeared to us as additional proofs of the chemical power of calcareous earth to combine with and hold this vegetable extract, and to use it for fertilizing the soil—instead of its flowing off, in waste, where enough lime for this purpose is not present. These facts and deductions would have been used as proofs in another place, but for an unwillingness to resort to facts, the extent of which was so imperfectly known. Observing the statement above, has induced us to present the subject here, with the view of its drawing forth further information, or correction from others.]

For the Farmers' Register.

COMMERCIAL REPORT.

The demand for every article of domestic produce continues brisk, and prices generally have advanced. The unfavorable aspect of the wheat crop, gave rise to some speculation in flour, and at one period during this month, the price had risen full one dollar per barrel. Sales were made in a few instances as high as $6.25 per barrel, but some reaction has since taken place, and the price may now be quoted $5.75. It is stated that the wheat crops in the northern and western states are not so much injured as had been apprehended—but there is little doubt that the deficiency in Virginia will be great, and that the market will open at a higher price than for many years.

The price of tobacco has also advanced during the present month. The sales reported at the inspections, embrace all rates from $5.50 to $17 per 100 lbs. Purchases are based, not on the existing prices in foreign markets, but on the expectation of advance; and the spirit of speculation which is unusually active, may not find itself sustained abroad. Such at least has frequently been the result.

Cotton has more than sustained the prices of last month. The current sales in Petersburg of fine quality, have been at 18 cents. Choice has commanded 18½—and the range of quotations is 16½ to 18½. The quantity received in the various ports of the United States to the 1st May, is about 1,130,000 bales, against about 1,000,000 at the same period of 1834. But this success has been in a great measure absorbed by increased consumption.

Stocks of almost every description command high prices. That of the United States' Bank, although its charter is about to expire, has advanced to 113.

The success of the Petersburg Rail Road is pretty well demonstrated by a recent declaration of 4 per cent. dividend for six months, and an advance in the prices of its stock of 15 to 20 per cent. during the current year.

X.

May 27.

TO SUBSCRIBERS AND CORRESPONDENTS.

In consequence of the increased amount of matter recently furnished by our correspondents, most of the pieces have necessarily been kept back longer than has been usual.

To avoid a continuance of such delay, and also for several other considerations of convenience, the 2nd No. will issue on the 15th of June, and the 3rd at our regular time of the 1st of the succeeding month, July—after which the publication will continue, as punctually as before, on the first of each month. With this view, this No., though not issued before June 1st, is dated in May.

GEOLOGICAL SURVEYOR.

Wm. B. Rogers, Professor of Natural Philosophy and Chemistry in the College of William and Mary, has been appointed by the Board of Public Works to make the geological *reconnoissance* of Virginia, as directed by the act of last session of the legislature.

THE FARMERS' REGISTER.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ON PRICE—THE CAUSES AND EFFECTS OF THE FLUCTUATIONS CONSIDERED, AND THE PRINCIPLES MAINTAINED APPLIED TO THE PRESENT RAGE FOR SPECULATION.

By THOMAS R. DEW, Professor of Political Economy, &c., in the College of William and Mary.

[The following communication was intended by its author to appear anonymously—and it may be observed that its form still accords with that intention—though we have obtained permission to give the author's name. This mark of its origin was desirable, not only for reasons which are sufficiently obvious, but also because the facts treated of are in some degree effects of the causes considered by the same writer in his "Essay on Usury," in Vol. II. of Farmers' Register—and the reasoning of the two communications have a corresponding connexion.

The exhibition of the principles which constitute *price* in general, and the investigation of the causes of unfounded and ruinous fluctuations, may be serviceable to the agricultural community at this time, when there is every indication of the approach of one of those fits of national delusion or madness, such as occured in the time of non-specie paying banks in this country, and such as every commercial country is sometimes liable to suffer from.

In addition to the close connexion of this and many other subjects of political economy with agricultural interests, we find ground for especial approbation of Professor Dew's manner of inculcating his doctrines, by showing their bearing on current events, and offering tests of their truth, in accessible and striking practical proofs. Without resort to some such mode of attracting attention to what is generally (though incorrectly) deemed a dry and repulsive study, the abstract truths of political economy will continue unknown to governments and to nations, long after having been established and undoubted in the opinions of reading men. Thus Adam Smith's exposure of the restrictive (or commercial) system of Europe, had delighted and convinced the learned and literary community, for half a century before it had any effect on the action of the British government—and his admirable work had long been a text book in the colleges in the United States, while our legislators still continued to act, in defiance of its truths, on questions of national policy and in accordance with the notions on trade of the past ages of darkness and ignorance.

Having thus expressed general approbation of the author's views, it is proper to mention an exception—which expression of dissent would otherwise be uncalled for, and unnecessary. It relates to the effects anticipated to Virginia from the present high price of slaves. That such consequences, whether immediate or remote will follow, we have not been convinced by the author's argument.—ED. FARM. REG.]

For the Farmers' Register.

But a little while since, as we all but too well remember, the country was plunged into the utmost distress from want of money, lowness of prices, and failure of credit every where; now we seem to be fast rushing into the opposite extreme—money is becoming very plentiful, prices have almost doubled, and commercial credit seems every where re-established. A speculating mania has been generated in our large commercial cities, and seems rapidly spreading itself through our country. If then this be a season of prosperity, it is one of hazard likewise. Now is the time for the exertion of that prudent foresight and calm deliberation, which alone can carry the man of wealth safely through those great, and sometimes rapid fluctuations of prices, always attendant on the rage for speculation. I propose briefly in this communication to point out the operation of those causes, which are calculated to make money plentiful or scarce, (as it is commonly termed,) and to show their operation on prices at this moment. This investigation cannot, I think, fail to be interesting at this time, and I hope will call forth the speculations of others much more competent to do justice to the subject than myself.

Circulating medium.

The first subject, undoubtedly, to which we must turn our attention in an investigation of this kind, is to the currency. What is the currency? What are the items which compose it? Every thing which passes from hand to hand, and will perform the function of money, must be regarded as currency. First then come the gold and silver coins, and bank paper; these of course form a part of the circulating medium, but not the only, or even the greatest or most important portion. Bonds, promissory notes, scrip notes, bills of exchange, stocks of every description, form likewise a portion of the circulating medium. All of these pass from hand to hand, and represent value, and therefore perform the functions of money. For example, I buy a tract of land, for which I give $10,000, and pay for it by passing to the seller ten bonds of a thousand dollars each. Now this exchange is effected without a single dollar of real money, merely by the agency of credit: in the same way I might have paid for it in stocks, or by giving bills of exchange, &c. But although these are to be looked on as circulating medium, it is evident that equal quantities of them will not perform as many exchanges as money; for the value of money is well ascertained—it bears no interest whilst in our hands, and therefore it circulates rapidly and effects many exchanges: whereas the value of bonds, promissory notes, bills of exchange, stocks, &c., have a value more indefinite; and most of this species of paper too, bears an interest while in our hands. Its circulation is therefore comparatively sluggish, in consequence, first, of the difficulty of fixing its value; and second, because we make a profit on it whilst lying in our hands, and therefore are in no hurry, generally, to get rid of it. But although this portion of the circulating medium be greatly inferior to money in the performance of the functions of circulation, yet it much more than makes up for this deficiency, by the vast amount of it which is in circulation. In England, for example, it has been computed that the bills of exchange alone in circulation are ten times more in amount than the whole money in the country: while the latter is estimated at £40,000,000, the former reaches the enormous aggregate of £400,000,000. In our country, the Bank of the United States alone does a business in exchange, amounting in the year to more than $250,000,000; while its own paper in circulation has never reached one capital, or $35,000,000. Now the bonds, or promissory notes of individuals, may be looked on as rising, in amount, infinitely beyond the aggregate of the bills of exchange and money together. Comparing then all the items of the circulating medium, *exclusive* of money, with the money, we shall be astonished to see how insignificant in quantity the latter is, when compared with the former. The fact is, money performs but few of the exchanges of society, by actual passage from hand to hand. "In England," says Mr. Wade, "by the use of bills of exchange, bills of lading, checks, scrip notes, clearing houses, and a variety of other contrivances, aided by a vast fabric of credit taken and given in open account, money (in its common acceptation,) hardly ever enters into mercantile affairs; it is the substance really meant and shadowed forth; but it rarely, as one may say, bodily passes from hand to hand." In our own country every one too, must have observed how rarely the exchange of large masses of property are effected by the intervention of money. In the great majority of cases, the property is paid for by the passage of bonds, bills of exchange, stocks, &c. and but a small portion by actual money. Hence what are called cash sales, if too frequent all of a sudden, in a particular neighborhood, even in times of great prosperity, will cause the property to be sold at a sacrifice, because of the great difficulty of commanding the actual money to make the purchase.

Effect of rapidity of circulation.

Having thus explained my notion of the components of the circulating medium, and shown that money is vastly inferior in amount to all the other items combined, let us now look a moment to the effect produced on the circulating medium by a rapid or sluggish circulation. And it is very evident, that while the quantity of the currency remains the same, its apparent amount and real efficacy may be either increased, or diminished, merely by an increase or diminution of the rapidity of circulation. For example, $10 passing through ten hands, in the course of the day, will accumulate as much property as $100 passing only once from hand to hand. Now, supposing the whole circulating medium to remain stationary in amount, but that the rapidity of its circulation is suddenly doubled throughout the whole country, then its *apparent* amount, and its *real* efficacy would be doubled likewise. With the help of these incontrovertible principles, let us now proceed to examine into the effect of the late money pressure in the United States. 1st. On the rapidity of the circulation—and 2ndly. On the amount of the circulating medium.

1st. *Effect on circulation.*

I shall not pretend to enter into an investigation of the causes which produced the late pressure in the money market. The nation has already been fully and completely enlightened upon this subject, by men whose minds can compare with any which the world can furnish. Moreover, it would require me to enter more fully into the field of politics, than would be agreeable to myself, or suitable to an agricultural journal. Suffice it to say that the pressure did every where take place; that a general difficulty of procuring money existed throughout the country; that prices, for a season, fell every where; and that confidence and credit for a short time, in the great commercial towns, were almost entirely destroyed. First let us see the effects of all this on the exchanges in society, and then on the rapidity of circulation in the currency.

During a pressure of the kind just spoken of, the loss of confidence and fall of prices, force a great deal of real and other property in the market, to be sold for payment of debts, which ordinarily remains stationary in the hands of its owners. Lands, houses, negroes, stocks of goods, &c., are thus forced to change hands, and of course increase the exchanges. Perhaps the sinking of prices generally may have a tendency to diminish the sales of the annual products of the soil; such as corn, wheat, tobacco, and sugar; but not of cotton, for the foreign market is the regulator of the price of this very important article. Hence it may be said, that a money pressure at first has a tendency, by the great quantity of property forced into the market for sale, rather to increase, than diminish the number of exchanges. Whilst, however, the number of exchanges increase, the circulating medium suddenly becomes much more sluggish, taking the whole aggregate, in performing the functions of circulation. The great capitalists who are in the habit of purchasing produce with a view to sell with a profit, when prices are falling, rather keep aloof from the purchase of raw produce, lest a further fall may injure them—their capital then circulates more slowly, and in consequence of it, the annual productions of the country are not distributed with that regularity, and adaptation to the various wants of the community, as under ordinary circumstances. The body politic in this situation, is like a patient suffering congestion in one part of the system, while there is a depletion almost to the loss of vitality in another.

Again—bonds, bills of exchange, &c., ordinarily performing the larger portion of the circulation of every country, have now a much slower circulation, and consequently less efficacy in effecting the exchanges; because as there is a general loss of confidence and credit, A, who has sold to B, is distrustful of his bonds, his bills, in fine of credit in every shape—he wants money. Money too has generally a sluggish circulation on such occasions, for every one getting possession of it, is disposed to hold it as long as possible—hard money seems to be almost the only true friend which one can get hold of in such times as those, and is consequently held with a miserly grasp. Persons will not venture it out without the best security, and on high rate of interest, obtained either directly or indirectly.*

*An inconvertible bank paper is never hoarded in this manner. It is like fire in each man's hands, he

Thus we find, first, that the number of exchanges has a tendency to increase during the first operation of a money pressure; and second, that the whole circulating medium of the country suddenly, from the very same cause, diminishes in the rapidity of its circulation, and therefore becomes less efficacious, as I have already proved.

2nd. *Effect of money pressure on actual amount of circulating medium.*

Let us now examine into the state of the circulating medium, and see whether during a money pressure, it has any tendency to increase in quantity, so as to counteract the operation of the causes above specified. It is evident, first, that the *money* has no tendency to increase in quantity; because, first, the banks are distrustful of the credit of individuals, and of one another; the curtailment forced on one, communicates to another, and finally all are obliged to curtail their accommodations and issues—hence a decided diminution in bank paper. Secondly, gold and silver in actual circulation diminishes in amount, because of the universal disposition to hoard, in consequence of loss of confidence. Thirdly, bonds and bills of exchange will generally diminish in amount, because these depend on credit altogether, and the first effect of the pressure is the destruction of confidence, and the ruin of the whole fabric of credit. Fourthly, stocks of every description diminish in value, or are entirely destroyed by the disastrous operation of the times. Money, and not stocks, is what the times call for. And thus do we see, that while the exchanges increase, the circulation of the currency grows sluggish, and the quantity in actual circulation rapidly diminishes.

Combined effect of these causes.

What then, let me ask, is the effect of the combined operation of an increase in the number of exchanges, greater sluggishness in the circulation, and diminution of the whole circulating medium? Most undoubtedly, a continued fall in prices, until certain causes are thrown into operation, which will counteract this downward motion. Mr. Hume, in his History of England, says there is a point in the depression of nations, in the scale of circulation, below which they cannot sink. Amelioration will then spring out of the very disorder itself. So I would say, in the disasters of trade and agriculture, there is a certain point of depression below which they cannot go. The self-sustaining energies of commerce are called into play, and apply the healing balm without the interference of government. Thus the causes, whose operation I have just been considering, gave a downward motion to prices in our country, until they reached that point which made this one of the worst markets in the world to sell *in*, and one of the best to sell *from*. The effect of this on foreign exchange will readily be perceived. More commodities were exported than imported. A money balance was created in favor of the nation. Hence a rapid and full current of the metals was soon seen flowing steadily into the country, and supplying the vast deficit in the circulating medium, occasioned by sluggishness of circulation, and diminution of the quantity from general destruction of confidence and credit. We all very well recollect, that a short time since, almost every paper announced the fresh arrivals of cargoes of gold and silver—and we know that at this moment, we have more foreign coins in circulation, than have been seen in the country for years past. The banks too seem generally to have drawn to their vaults large portions of the precious metals.

Effect of importation of precious metals, and of a restoration of confidence.

Now whilst the importation of the metals from abroad is gradually adding to the circulating medium, and therefore partially relieving, by this means, the pecuniary distresses of the country, the number of exchanges in society occasioned by forced sales, will of course have a tendency to diminish, because those sales will become less and less frequent, after the violence of the storm has already prostrated all that could not stand against it. Affairs will soon settle down to this new state of things. Many of the wealthy men of the former epoch, find themselves bankrupts at the commencement of the new—others again who could command a little ready cash during the crisis, find they have suddenly become wealthy. From this point, the operations of commerce once more begin to extend themselves. Confidence is gradually restored, and with it the credit system begins to be built up again, and the large accession of money from abroad, makes the money market much easier than before. The effect of all this is at first to raise prices gradually, and then more rapidly as a spirit of speculation is generated. When prices are sinking, the spirit of speculation sinks likewise, because each individual is fearful of purchasing, lest he be injured by a farther fall in prices. The credit system likewise is greatly contracted, because the rapid fall in prices, and the frequent bankruptcies occurring from day to day, destroy the confidence of man in man.

Now a rise in prices is accompanied with effects the reverse of these. 1st. The credit system becomes instantly enlarged. When prices are rising all are on the alert: the energies of man are drawn forth, his hopes which ever have an undue influence, are thrown into play, and the imagination spreads enchanting schemes and projects before him; he is disposed under those circumstances to rush into business, or to get possession of property, whose enhancement in value from the rising tide of general prosperity, is alone expected to make him wealthy. The borrower now can much more easily get money on loan than before, because general confidence is restored, and the constant rise in prices makes property a good security which before would have been deemed very inadequate. Buying and selling too under these circumstances, will generally be on credit more and more extended in proportion to the restoration of confidence. Now the immediate effect of the extension of credit, and the increased velocity given to the circulating medium, is to produce a superabundance of money. For, recollect I have previously shown that sluggish circulation and the destruction of the

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wants to get rid of it as speedily as possible, lest it may be caught on him at a still lower point of depreciation. Hence the inconvertible paper of the Bank of England, in 1797, soon relieved the money pressure, but only to bring on evils greater still, as an inconvertible paper always will do.

credit system generated an extraordinary demand for money, which flowed into the country through the medium of importations. The increased velocity of circulation and the re-establishment of the credit system have just the opposite effect, viz: to increase the apparent amount, and the real efficacy of the whole circulating medium. Now when we reflect that the currency has received immense additions during the money pressure from abroad; that the portions hoarded by individuals are thrown into circulation so soon as the panic subsides—that the banks which have rode through the storm are beginning to increase their business and push out their paper, and thus add to the circulating medium; that the United States' Bank has recovered from the shock which it sustained by the removal of the deposites, and is consequently, enabled to do a more liberal and extended business, thereby enabling other banks to enlarge likewise; we are not to wonder under these circumstances, that we have a redundant circulating medium; especially, when we recollect that this increased currency is circulating with greatly increased velocity: and the effect of these combined causes must be a vast enhancement of prices, and a consequent rage for speculation. I will exemplify this by a very simple illustration. Let us suppose a particular neighborhood, whose exchanges in ordinary times, are effected by $1000. Now I have shown if any causes operate to make the circulation only one-half as rapid as the ordinary circulation, then the $1000 will not appear to our little district to be more in amount, or in real efficacy, than $500. In this state of things, throwing out of view all other causes, prices in the neighborhood supposed would fall to half their former amount. Now let us farther suppose that this fall in prices should cause an importation of $500 additional into the neighborhood, and that the rapidity of circulation was again restored. Do we not clearly see that we should have a currency redundant by $500. And this would not only, on the great principle of supply and demand, carry up prices to their former level, but would increase them in the case supposed, fifty per cent. beyond that level. Now what I have been saying here of a neighborhood, may with equal propriety, be said of a whole nation. Let us suppose, for example, the circulating money of this country to be $100,000,000, in ordinary times; that the circulation becomes suddenly only one-half as rapid as before, then the whole $100,000,000, even supposing the quantity kept in circulation undiminished, will perform no more exchanges than $50,000,000 would with the former rate of velocity in the circulation. Prices then would generally sink to half their former amount; money would flow in, let us suppose $25,000,000, and immediately afterwards, the restoration of confidence, and the consequent re-establishment of the credit system would communicate to the circulating medium the same velocity as before, you would then have a redundancy of twenty-five millions of dollars, and a consequent rise of prices at least twenty-five per cent. upon the principle of supply and demand alone. But the probability is, prices would rise greatly beyond this point, in consequence of the effect produced by a speculating mania—for when prices are rising, every one wants to purchase—few are capable of reasoning upon the causes; hence an artificial competition is generated among the buyers and property rises greatly beyond what it should do, upon the principle of actual supply, and efficient demand. The reason of man on these occasions seems to be completely unhinged. He looks forward to the realization of wealth by changes in the price of property which he holds in his hands, and almost every one is disposed to turn speculator. And this speculating mania is generally first felt in regard to stocks, whose value is ever fluctuating, and therefore liable to the most sudden impulses, upwards and downwards. I understand at this moment the stock-jobbing spirit to the north has risen to a most extraordinary height. A gentleman, under date of the 28th ult., writes me from Philadelphia, that rail roads and canals are the order of the day there—that the papers scarcely find room for politics. He says, "two subscriptions have been opened for canals since I came here. The whole stock for the first was taken in thirty minutes. In the second, the whole stock was taken by the commissioners before the doors were opened. A rush and disappointment followed. Millions could have been taken," &c. All this arises from restored credit; from throwing suddenly the hoarded portions of money into circulation—from increased velocity of circulation—from issue of banks, &c., all of which have contributed to make currency redundant, prices exorbitant, and the spirit of speculation wild and reckless. When I saw certain politicians congratulating the nation upon fresh arrivals of gold and silver a short time since, I could not but reflect upon the shallow knowledge of political economy which such congratulations proved. The influx of gold and silver was the clearest proof that could be furnished, of the general distress of the country; of the loss of confidence and credit, and of the stagnation of trade and the circulation. The importation of the precious metals could only be effected by parting with a large portion of our wealth; and as soon as a sound currency and healthy circulation could be restored, this newly acquired portion was to be entirely redundant, and even mischievous in its operation, by raising in the community a speculating mania.

What is to check this rise in prices and spirit of speculation?

I will now examine into the manner in which this rise in prices is ultimately to be checked, and the spirit for speculation to be cured. And here let me observe, that as there is a certain point of depression below which prices will not go, in consequence of the *influx* of precious metals which this lowness of prices will certainly produce; so likewise there is a certain point in the elevation of prices beyond which they cannot well go, because of the *efflux* of the precious metals. It is this efflux which finally checks the speculating mania. I will explain: a rise in prices, when very great, make our country a good market to sell *in*, but a very bad one to sell *from;* hence our imports will greatly overbalance our exports, and a money balance will be created *against* the nation, which must be paid in money. This produces the exportation of money until the redundancy is sent off; then prices fall, and ruin overtakes the most adventurous in the game of speculation—they involve others, and prices once more sink, from loss of confidence and credit, and stagnation in circulation, below their average level, to be brought up again by the operation of causes already pointed out. Whenever the pendulum of price, (if I may use the expression,) has either by the operation of the natural course of events, or by the unwise and unskilful tampering of government, been thrown far into one extreme of the arc, it will, in its effort to regain its natural position, go almost so far into the opposite extreme; and the vibrations will frequently last through a long period of time.

Do these fluctuations depend entirely upon the banks?

Some suppose these fluctuations depend *entirely* upon the operation of the banking system. This however, is not the fact. Banks may do a great deal, but are by no means omnipotent in the regulation of a currency. For example: when loss of confidence, stagnation of circulation, and fall of prices derange the whole credit system, banks are affected like individuals; they are obliged to curtail their operations, and check the farther emission of paper, lest a run upon them may break them. They may not, under these circumstances, have the ability to relieve the distress, however strong the inclination; the relief must come through the wasting process of *buying* metals from abroad. Again: when prices begin to mount upwards, banks by seizing upon the favorable moment, may enlarge their issues, and thus swell still farther the already bloated state of the currency. But they cannot prevent, if they be specie paying banks, the correction of the evil by exportation of the metals; for so soon as these are redundant they will be gathered up for a foreign market; a necessary run will then take place on the banks for the purpose of making the collection, and these banks must either suspend specie payment, curtail their issues, or break. On the first supposition, the evil would have to correct itself by a rise in exchange against us with foreign countries, to the amount of the depreciation caused in the currency by suspension of specie payment. In the second case, prices would be lowered by contraction of the currency from curtailment. In the third, by contraction from the withdrawal of all paper which had emanated from the broken banks and a loss of confidence in the whole banking system, which would, by the runs made upon them, force all to curtail, or break. And thus may we always confidently look forward sooner or later from causes, whose operation I have pointed out, for either a rise in prices when they are very low, or fall when they rise very high. Whenever prices are disturbed, it is a long time before the equilibrium is again restored.

Effect of foreign demand for some of our agricultural products, on present prices.

So far, I have been arguing as if the present state of things were the result solely of that reaction which must sooner or later take place after great depression and stagnation of trade. But the rise in prices may be rapidly accelerated by an extraordinary foreign demand for some of our great staples. Most undoubtedly the rise in the *price of cotton* has at this moment very great agency in the high prices, and rage for speculation manifesting themselves every where. The price of cotton in this country is regulated by the prices abroad, because the foreign market taking up about four-fifths of the whole product of the United States, it is evident that the value of the article must be determined by the foreign, and not by the home demand. What is the cause of the immense rise which has taken place in the price of cotton within a few months I am unable to say. I am not at this moment in a condition to get at the statistical information, required for the investigation of this subject, and my mind not being particularly directed to it, until within a day or two past, I have not noticed from time to time in the papers such articles as might perhaps have given me a clue to the explanation of this interesting phenomenon.—Whatever may be the cause however, whether a general deficit in the cotton crops over the world, or in the United States particularly; or to the rapidly increasing demand for cotton fabrics all over the world; or to a spirit of speculation in England; or to the gradual reduction of the tariff; or to all these causes combined; certain it is, that the price of this most important agricultural staple, is now at a height which well indemnifies the planter for his labor, and will, if it could continue, diffuse wealth and prosperity over the whole of our southern country.

Let us now examine into the influence exerted by this rapid rise in the price of cotton. And in the first place it is manifest, that the rise in the price of cotton must have had a most important influence on the foreign exchanges. This article, alone constituting a very large proportion of the whole of our exports—say two-thirds, a rise in its price has therefore tended to swell the value of our exports, and of course, to make money flow more rapidly into the country—through the agency of a favorable balance of trade. From this cause then, the late money pressure may have lasted a shorter time than it would under other circumstances.

Influence of the price of cotton on the value of slaves.

Again: the rise in the price of cotton has most undoubtedly given an impulse to the price of slaves. Cotton is the great agricultural staple throughout almost the whole of our southern slave-holding states, and consequently, the marketable value of slaves will ever be determined by the value of the principal product of their labor. In Virginia and Maryland the price of slaves will always depend upon the external demand, and not on their intrinsic value in those two states.

If the price depended on the real demand arising among themselves, I doubt whether those states could afford to raise them even: so little would be their marketable value.

But there is another cause which I believe at *this moment* is operating in raising the price of slaves, and will exert a still more powerful influence in future. I mean the late *emancipation of the slaves in the British West Indies.* That act is certainly indefensible upon every ground of expediency, morality, and religion. But its impolicy appears most glaring when considered in a politico-economical light. Now whatever may be said about the relative efficacy and value of free and slave labor, there is no question, but that free labor, produced by sudden emancipation of slaves, is the most worthless and inefficient labor in the world. Let us take upon this subject the testimony of one who has favored emancipation in the West Indies, and who has already reaped some of the fruits of his folly. Lord Brougham in his *Colonial Policy*, says: "the free negroes in the West Indies are (with very few exceptions chiefly in the Spanish and Portuguese settlements) equally averse to all sorts of labor which do not contribute to the supply of their immediate and most urgent wants. Improvident, and careless of the future, they are not actuated by that principle which inclines more civilized men to equalize their exertions at all times, and to work after the necessaries of the day have been procured, in order to make up for the possible deficiencies of the morrow. Nor has their intercourse with the whites taught them to consider any gratification as worth obtaining, which cannot be procured by slight exertion of desultory and capricious industry." The report of the committee of the Privy Council of Great Britain in 1788, of Mr. Braithwaite, the agent for Barbadoes, and of M. Malouet who bore a special commission to examine the habits and character of the Maroons in Dutch Guiana, all agree in asserting that free negroes are idle and worthless, and will never provide for the morrow with the foresight of civilized beings. The latter, M. Malouet says, "Le repos et l'oisiveté sont devenus dans leur etat social leur unique passion." Does not our own experience in this country prove the truth of his assertion? Do we not find the free negro the pest of the society wherever he is seen? He is the same idle worthless creature in the north as in the south and west of our country. Have not the colonies at Sierra Leone and Liberia most conclusively proven the same fact? Does not the example of St. Domingo, which is now but a wreck of its former self, speak volumes on the same subject? Well then, with all these facts and evidences before them, what could British statesmen have foreseen from the emancipation of slaves in the West Indies, but idleness and worthliness of the whole population? and is not this actually the result? Do not all the statements agree in asserting, that the system of apprenticeship has failed to realize the anticipated advantages? and the state of things will be still more deplorable if ever the negro shall obtain his perfect liberty. Now what will be the consequence of all this? Why, that the British West Indies will soon cease to produce sugar for exportation, and will therefore throw the monopoly of its production into the hands of the slave-holding islands, and of Louisiana and the Floridas in our own country; and this will contribute at once to a rapid rise in slave property.

When St. Domingo was first liberated, the imaginations of mere speculative statesmen led them to behold a belt of black republics stretching through the West India Islands, diffusing their moral influence by commerce and social intercourse throughout the habitable globe. Now what was the fact? Why that St. Domingo was soon found to have such an idle, worthless population in her newly emancipated blacks, that her commerce was at once destroyed: she has entirely ceased to export sugar, although formerly the most productive sugar growing island in the world. Under these circumstances, to talk of moral influence, is perfectly absurd. Those black islanders have been by the effects of their own laziness and vices, as effectually cut off from the rest of the world, as if St. Domingo had been enclosed by Bishop Berkeley's forty foot wall of brass. The London Quarterly Review in one of its most powerful articles, asserts, that nothing but the condition of St. Domingo would have enabled the British West Indies to have borne the oppression of the mother country as long as they did; that St. Domingo being thrown out of the competition in the production of sugar, gave a sort of monopoly to the British Islands which enabled them to bear the oppressive regulating legislation of the parliament. Provided we are let alone by the busy meddling philanthropists who can attend to every body's business but their own, every negro that gets his liberty in the West Indies, or in South America, will contribute to a rise, upon precisely the same principles, in slave property in our country. The liberation of the slaves in the British West India Islands, is already producing that effect. If the French, Spaniards, Portuguese, Danes, &c. shall be unwise enough to follow this lead, the southern states of our union will most assuredly reap the benefit; and if Brazil too should follow the example, the effect would be almost complete. It would give us a monopoly in both sugar and cotton. Sugar is not made by free labor any where in the world. Even in China all the sugar and cotton districts are cultivated by slave labor, which, in my opinion, has set to rest forever, in warm countries, the question about the relative advantages of free and slave labor. The cultivation of sugar requires a great deal of hard labor which can be expected of the slave alone. In warm countries the principle of idleness triumphs over that of accumulation, and hence slave labor is universally the most efficient in warm and tropical latitudes. If all the slaves in the West Indies shall ever be liberated, Louisiana will become an *Eldorado*.

Effect of the rise of the price of cotton and slaves, on corn, wheat, tobacco, &c.

The rise in the price of cotton and of slaves is of itself calculated to give an impulse not only to all the agricultural products of the south, but of the north and west likewise, particularly of the west. Corn, which is the great staple of the middle states, is soon raised in value by high prices for cotton; because all the southern country, which is better adapted to the raising of corn than the middle states, raise cotton exclusively, and thus become purchasers of corn. The cultivation of cotton likewise, gradually extends itself even into the middle states, and thus diminishes the quantity of corn raised still farther. In addition to these circumstances, there has been a deficient corn crop for the last two years, in consequence of distressing droughts in the latter part of the season, and too much rain in the commencement. Now we must recollect that in any necessary of life like corn, whose price is dependent on the home demand, if a deficit occur, the price will rise greatly more, than in proportion to the deficit.

The high price of cotton and corn will quickly communicate itself to horses, mules, hogs, cattle, &c., which constitute the great staples of the west: for with corn and cotton high, the middle and southern states will cease, in a measure, to rear those animals, and consequently will become purchasers. Wheat and tobacco depending mostly on the foreign market, will not be so much affected. But as ours is the principal tobacco growing country for all Europe, and as an extension of the cultivation of corn and cotton has a tendency to diminish that of tobacco, it is evident that tobacco would be more influenced than wheat by rise in the price of cotton and corn. Accordingly, we find that tobacco is now selling very high. The high price of cotton is likewise calculated to make the south a better market for all the products of the north, and to give increased activity to the commercial interest, in which the north possesses the deepest stake. Mr. Lee, the author of the celebrated Boston Report on the Tariff, and one of the best statists which this country can boast of, estimated the advantage flowing to the north from the transportation of the cotton of the south, as equal to $5,000,000 on cotton, amounting in value to $25,000,000.

Summary of the causes of the present prices.

Thus have I rapidly sketched out the causes which have been operating in producing the present prices. In the first place, the late removal of the deposites, and the consequent caution and curtailment of business on the part of the Bank of the United States, together with the unfriendly relations existing between that bank and the state banks, which imposed the necessity of a similar curtailment on the latter, gave a shock to public and private credit, which plunged the country into the greatest distress, and rendered the circulating medium scarce every where, by both diminution of quantity, and of the rapidity of circulation. This at once brought down prices to a minimum. The importation of the precious metals from abroad, was the immediate consequence of lowness of prices, and tended to relieve the pressure by increasing the currency. By and by, the banks that rode safely through the storm, began, when things settled down, to enlarge their business, confidence and credit were restored, and a redundant circulating medium is the consequence. This of itself is capable of producing high prices, independent of other causes; but in the present instance, it has been aided by the great foreign demand for cotton, which together with the emancipation of slaves in the British West Indies, has made slaves rise in value throughout our slave-holding country. It has indirectly contributed to the high prices of corn, tobacco, and the staples of the west, and will no doubt, if it continues, diffuse prosperity over all the northern states, in the way I have already explained.

Prospects.

In the mean time let me ask what are our prospects? I answer, that this rise in prices has already excited a rage for speculation which will, in all probability, carry up prices still higher. A fever for speculation, when once excited in the body politic, always produces both economically and morally, the most disastrous consequences. It destroys that regular persevering industry, by which alone a nation can be enriched. It attracts the capital and resources of the country towards chimerical projects, and airy bubbles. During the prevalence of the South Sea scheme in England, hundreds of projects were set on foot—and the sums proposed to be raised by these expedients, amounted to more than $300,000,000, which exceeded the value of all the lands in England. On these occasions, so intoxicated do the people become with a spirit of adventure, that they fall victims to the grossest delusion. Only call it a joint stock company, and thousands of dollars instantly flow into the scheme. All are anxious to enrich themselves by a single stroke of good fortune. The hard-working plodding man is looked upon with contempt. Habits of the most luxurious and vicious character are speedily introduced. There is nothing more true than the old adage, "*easy come—easy go.*" A man who makes a fortune at a stroke, is almost sure to spend it extravagantly. He must live high and give costly entertainments, to purchase the attention and consideration of the new circle into which his wealth has just introduced him. The great merchants, lawyers, physicians, &c., follow the example which is set by the speculators—a reckless profligate gambling spirit is spread through the country—one-half the nation is trying to grow wealthy by the ruin of the other half. Every kind of deception, falsehood, and trickery are resorted to for the purpose of influencing the markets. "During the infatuation produced by this infamous scheme, (South Sea,)" says the historian, "luxury, vice, and profligacy increased to a shocking degree of extravagance. The adventurers, intoxicated by their imaginary wealth, pampered themselves with the rarest dainties, and the most expensive wines that could be imported: they purchased the most sumptuous furniture, equipage and apparel, though without taste or discernment—they indulged their criminal passions to the most scandalous excess—their discourse was the language of pride, insolence and the most ridiculous ostentation—they affected to scoff at religion and morality, and even to set heaven at defiance." A bill was actually brought into the British Parliament for the suppression of blasphemy and profaneness, to so fearful a degree had the spirit of speculation and gambling affected the morals of the people.

The disastrous influence of this rage for speculation in our own country during 1817, 1818 and part of 1819, was almost as great as that produced in England by the celebrated South Sea bubble, or in France by the Mississippi scheme.

With regard to Virginia, I do not think the mania will be so apt to reach her in its most aggravated form. The high price of negroes and cotton, is now producing a fearful emigration to South West, where golden harvests will be realized, if present prices can only be kept up. The spirit for speculation will, in a great measure, direct itself towards south-western lands. Hence although corn, wheat, and tobacco may rise, this exhausting drain of our labor and capital to the south-west, will keep land in this state from rising *pari passu*. Our labor and capital both are swept from our soil as fast as accumulated. At this moment, in Virginia, there is a mighty struggle going on between the elastic principle of the black population on the one hand, and the drain to the south-west on the other. And if the high price of slaves shall be kept up for a few more years, I doubt whether all the procreative energies of the race can compensate for the emigration; and in that event, we shall be obliged to fill up with Irishmen and northern laborers, or leave the soil of the state comparatively stript of labor. In the mean time, however, let us preserve our sobriety, our industry, and our morality; enjoying the present advantages of high prices, without rushing into schemes and adventures of a wild and reckless character, under the vain belief that these times are to last forever. Sooner or later, if prices rise above the natural level, they must come down by a process which I have already pointed out. If cotton shall fall speedily, or if a superabundant corn crop shall be made this year, these extravagant prices would be checked at once. And we must recollect too, that the Bank of the United States is quickly to wind up, and if its curtailment shall be very rapid, it may force the whole banking system of the country to contract its accommodation, and thus perhaps to give a shock once more to public confidence. At all events, let us remember the moral of the famous epitaph—"I was well—I wished to be better—and here I am."

May 21, 1835.

From the Silk Culturist.

LOCUST AND MULBERRY TREES.

The Massachusetts Society for promoting Agriculture, have awarded to Mr. William Clark, Jr. of Northampton, a premium of $20 for a plantation of locust trees. The timber of locust is invaluable on account of its durability. It is sought for by ship builders and the government price for it has been as high as seventy five cents a cubic foot. Locust posts, set in the ground have been known to last upwards of half a century. It is also excellent for fuel. Though the rapid growth of this tree, and its great value renders it a prime object of cultivation, yet the mulberry will be found to be altogether more profitable. Its growth is as rapid—its timber is as valuable, and, in addition to both, its foliage will yield a large annual profit in rearing silk worms. We are credibly informed, that mulberry posts, of the ordinary length and size for fences, have been sold in New Haven for $3 a piece. Every farmer may double the value of his farm in ten years, by cultivating the white mulberry tree, for the sole purpose of timber and fuel.

From the Maine Farmer.

LICE ON CATTLE—NEW WAY TO KILL THEM.

For some wise reason or other, it has pleased providence to create a set of animals in the shape of what are commonly called lice, to live upon other animals. These are often troublesome to farmers. An animal infested with them cannot thrive, keep him ever so well, as another animal kept in the same way that is not infested with them. The natural history, that is, the habits and characteristics of these animals, is not well understood—how long they are in the egg, for they are oviparous—how long it is before they come to maturity and can propagate—how many eggs a female can lay at a time—how long they live if not molested—what they like best and what they hate worst—are questions which every farmer ought to know how to answer, and which we doubt if one in the world can answer. Farmers have different modes of destoying them. *Unguontum*, or *anguintom* as we Yankees too often say, will kill them, and oftentimes the cattle too. It is a preparation of mercury and poison. Bacon fat will kill them. Tobacco juice will kill the old ones and hatch the eggs if put on warm, to our certain knowledge, and oftentimes make the animal tobacco sick—no pleasant feeling. All these preparations are somewhat troublesome to apply, especially the tobacco juice, because the beast must be sopped in the gravy of the Indian weed.

We have been informed that Capt. John Haines of Readfield, has discovered what to us, is a new remedy, and we presume is so to others. It is simply the application of tar in a few spots about the body of the animal troubled with them, and it proves sure destruction to them. If this is a fact, the discovery is a very important one.

ON ORCHARD GRASS.

To the Editor of the Farmers' Register.

Henrico, 9th May, 1835.

If no better reply to the queries of H. P. R. (in the Register for this month) "on Orchard Grass," (Dactylis Glomerata) should offer, perhaps the following observations may be useful to him. Although I have seen this grass extensively and successfully cultivated in this country, yet as my practical experience of it was obtained in Scotland, I shall here give him a statement of the way in which I have there cultivated it, and have seen it done to a considerable extent by others. There we generally sow the seed in the month of March, at the rate of from one and a half to two bushels per acre, with from eight to ten lbs. of red clover seed, (if sown alone, two and a half bushels I believe would not be too much,) having previously steeped the seed in water from six to eight hours. Some prefer moistening the seed by merely sprinkling with water, and keeping it in a damp state for nearly two days. This method, I think, is objectionable; as in that state it is very liable to heat, unless great care be taken of it. After being thus steeped, the seed very easily and speedily takes root. The ground should be well cleaned, and the seed carefully covered in with a light harrow. It has been supposed not to succeed well when sown down with a grain crop; but I have had it sown both with wheat and barley, and always succeeded in having a good crop the succeeding season, which was generally cut for hay. It is a very early grass, and in order to make good hay of it, it should be cut before it gets fully ripe. This must be regulated according to the seasons, and the judgement of the farmer. It will be found generally to succeed well in any soil that will bring a tolerable crop of clover. It is well known as a very valuable pasture grass both for sheep and milch cows; and when early pasturage, or soiling is an object, it will be found to be of great importance. When intended to be cut for hay, it should neither be cut nor pastured the preceding season later than the middle of August—perhaps in this country a month later.

I shall conclude with an extract of a letter from Mr. Falla, Seedsman, Newcastle, England, to Sir John Sinclair as published in the English Farmer's Register. When speaking of the produce of the seed of the orchard grass sown on a square yard as an experiment in a corner of his nursery ground, he says, "in the spring of 1814, it had so abundant and beautiful an appearance, that I was on the 30th of April, (a dry day) induced to cut and weigh its produce, which I found to be 16 lbs., amounting to the astonishing quantity of thirty-four and a half tons per acre; and that at a period when any other green article fit for soiling was not above two or three inches long. I cut it again the 24th of June and obtained eight lbs.; and again on the 10th of September, when I had ten lbs., (both dry days) making a total from three cuttings, of thirty-four lbs., equal to seventy-three tons per acre."

A. NICOL.

From the *Elements of Agriculture*, by David Low, Professor of Agriculture in the University of Edinburgh.

MANURES.

All substances which, when mixed with the matter of the soil tend to fertilize it, are, in common language, termed manures.

Manures may be composed of animal or vegeble substances; or they may consist of mineral matter; or they may be partly derived from mineral and partly from animal and vegetable substances. They may therefore be classed, according to their origin, into—

1. Animal and vegetable manures,
2. Mineral manures,
3. Mixed manures.

In describing this class of substances, it is not my design to treat of their chemical mode of action. This investigation forms one of the most interesting parts of the chemistry of agriculture; but it is not essential to that practical knowledge of the subject which will suffice for the common purposes of the farmer. The remarks to be made therefore, on the mode of action of these bodies, will be of a very general nature.

1st. *Animal and vegetable manures.*—Chemical analysis shows us, that all plants, and all the products of plants are resolvable into a small number of simple bodies, in various states of combination. These bodies are—carbon, hydrogen, oxygen, and in smaller quantity, nitrogen or azote. These form the essential constituents of all vegetable substances. But there are likewise formed in plants, though in comparatively minute quantity, certain other bodies, consisting chiefly of the four earths, silica, alumine, lime, and magnesia, of the oxide of iron, and of the alkalies soda and potassa, but chiefly the alkali potassa.

Now, all these bodies, or the elements of all these bodies, exist in animal and vegetable manures; for these being animal and vegetable substances are resolvable into carbon, hydrogen, oxygen, and nitrogen, with the intermixed earthy and other bodies, existing in the living plants.

In supplying, therefore, animal and vegetable substances to the soil in a decomposing state, we, in truth, supply the same substances which enter into the composition of the living plants. The substances indeed exist in the dead matter of the manures, in states of combination different from those in which they exist in the living vegetable; but still they are present, and must be believed to supply the matter of nutrition which the plants in growing require. Science has made known to us the truth, that the living plants and the dead manures are resolvable into the same elementary substances; but experience has not the less taught the husbandman in every age, that all animal and vegetable substances, mixed with the matter of the soil, tended to fertilize it, by affording nourishment to the plants which it produced.

The simple bodies which form the substance of manures exist in various states of combination, and often in the solid state. Now, there is reason to believe, that, in order that these solid matters may be absorbed by the roots of the growing plants, they must be dissolved in water. The absorbing pores of the roots of plants are so minute, that they are only to be discovered by the microscope. The solid bodies, therefore, which find their way into these pores, may reasonably be supposed to be held in solution by that aqueous matter which enters into the roots of plants, and forms the sap. Water is apparently the medium by which all the matter of nutrition, in whatever form, is conveyed into the roots of plants, and without which, accordingly, vegetation is never known to take place.

Holding this opinion to be just, the substances which form vegetable and animal manures, before they can be rendered available, as nutriment to plants, must be rendered soluble in water.

Of the means which nature employs for this purpose, fermentation appears to be the chief. By this process, the elementary parts of the substance fermented assume new forms of combination, and become fitted to supply the matter of nutrition to plants in that form in which it can be received, by the pores of the roots. The fermentative process is completed after the substance to be used as a manure is mixed with the matter of the soil; but it is common also to cause it to undergo a certain degree of fermentation before it is mixed with the earth. This is the method of preparing this class of manures for use, which is employed in the practice of the farmer.

Animal matters decompose with facility when acted upon by moisture and the air, the greater proportion of their elementary parts making their escape in various forms of gaseous combination, and leaving the earths, alkalies, and carbonaceous matter remaining.

When this decomposition takes place beneath the surface of the ground, these gaseous compounds, as well as the carbon, (which there is reason to believe assumes also the gaseous state by combining with oxygen,) may be supposed to be partially or wholly retained in the earth to afford the matter of nutrition to the plants.

Purely animal substances, therefore, which thus readily decompose, do not absolutely require fermentation before they are mixed with the soil. Yet even in the case of purely animal substances, certain beneficial consequences result from subjecting them to a previous state of fermentation. Thus the urine of animals, when applied in its recent state to the soil, is not found to act so beneficially as a manure, as when a certain degree of previous fermentation has been produced.

And there is another purpose promoted by causing even pure animal matter to undergo fermentation, and this is, that, being mixed with vegetable matter it promotes the more speedy decomposition of vegetable fibre.

Vegetable fibre is, under certain circumstances, a slowly decomposing substance. When vegetables are green and full of juices, they readily ferment; but when the stems are dried, as in the case of straw and other litter, they decompose with slowness, and the mixing them with animal matter hastens the putrefactive fermentation. This mixing of animal with vegetable matter is the process employed for preparing the greater part of the dung of the farm-yard.

The dung of the farm-yard is the produce of the hay, straw, turnips, and other substances used as forage or litter upon the farm. It is collected into one or more yards, and fresh litter and all other refuse being added to the mass, it gradually accumulates, until it is carried out to the fields for use.

The manner of feeding cattle in their houses and yards will be afterwards explained. It is sufficient with relation to the present subject, to observe, that the larger cattle may either be fed in stalls in close houses, or in yards in which they receive their food. When they are fed in close houses, their dung and soiled litter are carried to the heap in the yard, where it gradually accumulates, and when they are fed in the yards, their dung, in like manner, accumulates there, being in the mean time compressed by their treading upon it.

In the practice of the farm, to be afterwards especially described as suited to the circumstances of this country, the larger cattle of different kinds are brought home to their houses and respective yards before winter. Some are kept in their stalls in close houses, and their dung and soiled litter are carried out daily to the yards, whilst others receive their food in the yards themselves, and thus tread upon the heap. In this manner the mass of dung accumulates during the period of feeding, and at the proper period, in the following spring or summer is carried out to the fields and applied to the land.

The dung of the farm-yard is thus sure to be a collection of animal and vegetable substances. It consists of the excrements of the animals kept and fed upon the farm, together with the straw or other materials used as litter, and generally of the refuse and offal produced about the homestead. This mixed mass is collected during the period of feeding, when it undergoes a certain degree of fermentation. When trodden by the feet of the animals kept in the yards, the effect is to exclude the external air, and to prevent the fermentative process from proceeding with that rapidity which would take place were the mass not compressed.

The principal animal substances which are mixed with the ligneous fibres of the litter, and which cause it to undergo decomposition, are the dung and urine of the animals.

The properties of this dung, to a certain extent, depend upon the kind of animals, and the nature of their food. The dung of horses is easily fermented, and is more readily decomposable in proportion to the succulence and nutritive qualities of the food consumed. This also holds with respect to the dung of oxen. When the animals are fed on straw and the dried stems of plants, the dung is less rich and decomposable than when they are fed on turnips, oil cake and other nourishing food; and the same thing holds with respect to the dung of the hog and other animals. The dung of the different feeding animals is mixed in the greater or less proportion with their litter, and the greater the proportion of the animal to the vegetable matter, the more readily will it ferment and decompose.

The urine of the animals, again, is in itself a very rich manure, and contains, in certain states of combinations all the elements which enter into the composition of plants. It is necessarily mixed with, and partly absorbed by, the litter and other substances in the yards, of which it hastens, in a material degree, the fermentation.

The urine however, is apt either to make its escape by flowing out of the yards, or to be imperfectly mingled with the litter. It becomes, therefore, a part of the management of the farm-yard, to provide against either of these contingencies.

The farm-yard should be made level at the bottom and paved if the sub-soil be loose and sandy, and the bottom should be sunk somewhat below the surface of the ground. As a portion of the liquid will flow from the stables and feeding houses, gutters of stone should be made to convey the liquid from these into tanks or other reservoirs adjacent to the yards. The same means are to be taken for conveying away any excess of liquid from the yards themselves. This is not done for the purpose of draining the yards of moisture, which would be an error, but for the purpose of preventing any excess or liquid from being lost. The principal cause which produces a great flow of liquid from the yards is an excess of rain, which, falling upon the heap faster than it can be absorbed, washes away the urine.

Three methods may be adopted for the management of the liquid which is obtained from the feeding houses, or which oozes or is washed off from the mass in the yards.

1. It may be pumped from the tank or reservoir into which it had flowed, conveyed back to the farm-yard, and spread over the surface of the heap. In this manner it will be imbibed by the litter, and tend to hasten the decomposition of the mass.

2. It may be pumped up when convenient, and conveyed in barrels to the field, and spread over the surface, a species of manuring which, under certain circumstances, is exceedingly efficacious.

3. In the bottom of the tank or reservoir to which the liquid is conveyed, may be placed absorbent earths, stems of plants and other matters. These being saturated, will become very rich manure, and may either be carried from the tank to the field, and applied to the ground, or put into heaps or composts, until the period of using them shall arrive.

This method of collecting the excess of the liquid from feeding houses, and yards, is perhaps the best in the common practice of the farms in this country. In Flanders, where extreme care is bestowed in the collection and preparation of liquid manures, there is a smaller proportion of straw and hay produced on farms, than in the mixed system of agriculture of Britain. There is not, therefore, so great a proportion of ligneous fibre to be decomposed. The Flemings, accordingly, pursue the mode of managing their manure, which the circumstances peculiar to their agriculture render expedient. They can always ferment sufficiently the fibrous matter of the heap of their farm-yards, and therefore they have always a spare supply of liquid in a separate state. But in this country, where we aim on producing a large quantity of hay and cereal grasses, we require nearly all the liquid from the feeding animals, to moisten and ferment the general mass of the farm-yard.

When the animals of the farm are fed on tolerably rich and succulent food, and when the proportion of straw is not too large, there is no difficulty in fermenting the mass of the farm-yard to the degree required; but when the quantity of straw is very large in proportion to the more moist and succulent food consumed, as sometime occurs in the case of clay land farms in certain districts, then there may be considerable difficulty in getting the straw sufficiently fermented and decomposed for use. This may arise from want of moisture, as well as from a deficiency of animal matter; and as we may not at the time have the power of supplying the latter, we must endeavor to keep the heap moist by soaking it, in the absence of rain, with water. But the permanent remedy for this evil is to increase the quantity of such nourishing food as the farm will produce—namely, cabbages, tares, clovers, and other succulent and nutritive plants.

Sometimes, even when there is no extraordinary excess of dry litter, the fermentation of the heap in the yard after proceeding to a certain degree, suddenly stops, by which the manure is much injured. This action is termed *fire-fanging*. It arises from the want of moisture, and when it happens it is often very difficult to renew the fermentation. The best remedy is to turn over the heap, soak it with water, and mix it with horse dung, or any animal offal that can be obtained.

With these exceptions, the management of the farm-yard is not attended with any difficulty. We have seen that the mass consists of a collection of the excrements of the animals kept upon the farm, of the straw and other substances employed for litter, and generally of any refuse or offal produced at the homestead; and that this mixed substance is accumulated chiefly during the months of winter, undergoing during this period a certain degree of fermentation and decomposition in the yard where it lies.

The substance thus collected and partially fermented, is to be applied to the grounds during the months of spring, summer, or autumn, immediately following the winter in which it has been prepared. It should be always applied as soon after it is prepared as possible, there being a waste either in retaining it too long, or in causing it to undergo a greater degree of fermentation than is required.

In the process of the putrefactive fermentation, the elements of the body fermented, in assuming their new forms of combination, partly make their escape in the gaseous state. In the fermentation of manures the decomposition may proceed so far that the great mass of the substance shall be exhaled, leaving behind only the earthy and alkaline, and a portion of the carbonaceous matter of which it is composed. In the treatment of this class of substances, therefore, the putrefactive fermentation should neither be continued longer, nor carried to a greater degree than is necessary for the purposes intended.

In practice, our object is to produce certain kinds of crops; and certain kinds of plants, it is found, require a greater action of manures at particular stages of their growth than others. Thus the turnip, the carrot, and the beet, which are sown as will afterwards be seen, in the early part of summer, require that the manure applied shall be in such a state of decomposition as to act upon and nourish them in the first stages of their growth, and if this be not so, the crop may entirely fail. In these and similar cases, accordingly, a complete preparation of the farm-yard dung is an essential point of practice.

Certain plants, again, do not require the same state of decomposition of the dung. Thus the potato requires less in the first stages of its growth, than the turnip, and hence it is not necessary to subject the manure to be applied to the same degree of fermentation.

In some cases, too, as in the process of the summer fallow, to be afterwards described, the manure is mixed with the soil some time before the seeds of the plants to be cultivated are sown. In such case the manure undergoes the necessary fermentation in the soil itself, and does not require that previous preparation which, in the case of the turnip and some plants, is required.

But where no necessity exists for fermenting the matter of the farm-yard beyond the degree requisite for the special purpose intended, it is always a point of good practice to ferment it to that degree. In order to know when dung is sufficiently fermented for the particular use required, a very little practice and observation will suffice. When it is fully fermented, the long stems of straw which formerly matted it together, are in such a state of decomposition, that the parts can be readily separated by a fork. It is not necessary in any case that it be in that extreme state of decay in which we often see it used by gardeners, and when it can be cut with a spade like soft earth. Whenever farm-yard dung has been fermented to this degree, it has been kept beyond the proper time, and the management has been bad.

The mass, we have seen, is collected chiefly during the months of winter, and will always be ready to be applied to the ground in the spring, summer, or autumn immediately ensuing; and there is no case in which it is advisable to keep it beyond the year in which it has been collected.

The common and convenient practice, is to carry it out from the yards where it has been collected, to the field where it is to be used, and there to pile it up in one or more large heaps, so that it may undergo the further decomposition required, before being applied to the land.

When, accordingly, after the dead of winter, as towards the end of December, and during hard frosts and snows, the men and working cattle upon the farm cannot be otherwise employed, we may begin to carry out the dung to the fields where it is to be used. It is carried out in the carriages of the farm, into which it is lifted by large forks to be afterwards described. This partial carrying out of the dung from the yard proceeds when occasion offers, or when the state of the weather prevents the other labors of the farm from being carried on. And when the feeding cattle are finally removed from the houses and yards, and turned out to pasture, which, in the north of England, is generally by the middle of May, the whole remaining dung may either be carried to the fields, or remain in the yards till required for use.

The dung, as it is carried out to the fields, is to be laid in the large heaps, which may be about four, and four and a half feet high, and of such other dimensions as may be convenient. When the dung is placed in these heaps, it is in a state very favorable to further fermentation; for it is to be observed, that in all cases, the turning over of the dung, so as to give access to the air, causes an increase of fermentation, and this is the method adopted by farmers and gardeners, when they want to give a greater degree of fermentation to any heap. Should the dung in these large heaps not ferment to the degree required, they are to be turned over, and formed into new heaps, the upper part being placed below, and what was before below at the top. By this means the fermentative process will be renewed: and should this turning not be found sufficient, the heaps must be again turned over, so that they may be brought to the degree of decomposition requred. The large heaps of this kind should not be placed in a very exposed situation, so as to be too much acted upon by the winds, and it is often a good precaution, and a necessary one in very warm countries, to face up the sides with a little earth or turf and to strew some earth upon the top so as to prevent the escape of decomposing matter. When it is wished to hasten the putrefactive process in these heaps, it is better that they be not compressed by the carriages going upon them to unload; but where there is no peculiar necessity for hastening the putrefactive process, the carriages and beasts of draft can go upon the heap without injury. When peculiar care is required, as when the dung has been injured by fire-fanging, or otherwise imperfectly fermented in the yards, it should be spread over the heap in layers, so that one layer may undergo a slight fermentation before it is compressed by that which is to be placed above it.

Sometimes the mass may be turned over in the yards where it lies, and allowed to ferment before it is carried out to the fields for use. In this case the workmen begin at one side of the heap and with large forks, turn it over, laying that which was before uppermost underneath, so as that the whole may be reversed. If after this process of turning, no treading of cattle is allowed, the fermentation of the mass will proceed with rapidity, and then the whole may be led out at once from the yards to the fields for use.

When the dung produced is very rich and well decomposed, as when cattle have been feeding in stalls on juicy and nutritive food, it may not appear to require this turning over to fit it for use; yet even in such a case it is generally beneficial that it be turned over at least once before being used, the effect being to ferment the mass not only sufficiently, but equally, and to mix its different parts together. It may be observed also, that when the mass of vegetable and animal substances is thrown into a common yard, some care should be bestowed in spreading it equally, so that one part of the yard may not be filled with rich dung, and another with poor. The dung of horses, for example, is more susceptible of quick fermentation than that of oxen. When the stable, therefore, opens upon a common yard, the horse dung should not be suffered to accumulate in a mass about the stable door, but spread abroad upon the heap.

Farm-yard dung is chiefly applied to the soil, by being spread upon the land when in tillage, and covered by the plough. The periods at which this is done, and the manner of doing it, will be afterwards pointed out. By being covered by the earth, the dung soon passes through its course of fermentation, and becomes decomposed and mixed with the matter of the soil.

This valuable substance must be economized in the manner of applying it. The soil must be kept as rich as the means at the farmer's hands will allow; but it is an error in practice to saturate it at one time with manures, and to withhold them at another. They ought rather to be applied in limited quantity, and frequently, so as to maintain a uniform or increasing fertility in the soil.

The produce of the farm-yard will necessarily afford the chief part of the manure consumed upon farms which do not possess extraneous sources of supply. But besides the produce of the farm-yard, there are certain vegetable and animal substances which in their separate states may be applied to the manuring of land. An example of the application of vegetable substances, in this state, is where certain plants are allowed to come in flower, and are then ploughed down in their green state, and mixed with the matter of the soil. This is a practice derived from very ancient times, and is yet followed in Italy, and other parts of Europe.

Vegetable matter when thus covered by the soil in its green and succulent state, readily undergoes decomposition, and forms a very enriching substance. The practice, however, is chiefly suited to the warmer countries where vegetation is very rapid, and even then it argues a somewhat low state of the art, and is not the best way for producing decomposing matter for manures. When we are able to raise green food of any kind, it is better that we apply it in the first place to the feeding of animals, for then it not only yields manure, but performs another and not less important purpose.

When, however, the practice is for any reason adopted, the period at which the plants should be ploughed down is just when they are coming in flower, for then they contain the largest quantity of readily soluble matter, and have the least exhausted the nutritive substance of the soil. The plants employed for the purpose by the ancients were chiefly the leguminous, as the Lupine, which is still used in Italy for the same purpose. Buckwheat is also employed, and appears to be the plant best suited for the practice in northern countries, for it is easily cultivated, and soon arrives at the necessary maturity. For the same reason, spurry has also been cultivated for this purpose: nay, the clovers have been thus employed at the suggestion of speculative writers even in England, and thus the error has been committed of employing a valuable article as a manure, which might have been employed in the first place in supporting live stock of the farm.

The leaves of trees also form a vegetable manure, though not a good one: for although leaves enrich, to a certain degree, the surface upon which they fall and decay, they will rarely pay the expense of collecting them expressly for manuring land.

The roots of plants disengaged from the soil in the process of tilling and cleaning it, are also employed as a vegetable manure. Some of these, however, as the couch grass, being very vivacious, would readily spring again; and therefore it is necessary that their vegetative powers be destroyed, which may be done by mixing them with lime, and forming in this way a compost. Many farmers, however, to save time, or to prevent the risk of the plants springing again, burn them in little heaps upon the ground at the time of their being collected, and spread the ashes upon the surface. This may be sometimes convenient, but the effect is, that the principal nutritive part of the plant is dissipated, and nothing left but the carbonaceous, earthy, and other insoluble matter.

Extracts from the last edition of the "Complete Grazier."

ON THE ECONOMY AND MANAGEMENT OF THE DAIRY.

On the produce of a Dairy.

The produce of a dairy is to be regarded in a two-fold view, as it respects *quantity* and *value*. Both depend in a great degree upon management; for if the cow be injudiciously treated, or the butter and cheese be badly made, both the product and the price will be materially diminished. There is no part of farming more steadily profitable than the dairy; but, at the same time, none demands greater judgement and attention.

Of the three objects of the dairy—selling the milk, or, as it is commonly called, *cow-keeping; making butter and cheese;* and *suckling;*—the first is generally the most profitable, at the usual price obtained for the milk. It can, however, be only carried on in the immediate vicinity of large towns; and even there, the expense of providing fodder, and the fluctuations of its price, while that of milk seldom changes, together with the injury to the health and consequent value of their cows, from the close confinement to which they are usually subjected, and the nature of the food supplied for the purpose of producing an extraordinary flow of milk, often render it a hazardous, and always an unpleasant business.

The making of butter and cheese, which may be distinctively termed *the dairy*, ranks next in the scale of profit; though we cannot but observe that this is contradicted in a late and very minute account of an extensive farm in the Vale of Berkeley, published under the sanction of the Society for the Diffusion of Useful Knowledge.* However this may be, a well fed cow, of a good breed, will produce, on an average, 180 lbs. of butter in the season; and this, where there is an immediate market for it while fresh, together with the value of the skim-milk, either in feeding pigs or making skim-milk cheese, will pay better than cheese alone. The common calculation is, indeed, 150 lbs.;† but this is made upon mixed stock, which afford no certain data. In the Epping district, where no particular attention is paid to the selection of stock, and where there is an indiscriminate mixture of Devon, Suffolk, Leicester, Holderness, and Scotch, the calculation, in a well managed dairy, amounts to 212 lbs.

viz:	
6 lbs. per week, during twenty-six weeks	156
4 lbs. per week, during fourteen weeks	56*

In forty weeks, which is full four weeks sooner than they need be generally allowed to go dry, and there is no doubt that, with proper care in the choice of the cows, and proper pasture to support them, that calculation would be supported in good years; it might not in parching seasons, but then all dairy produce must suffer equally. Mr. Aiton's calculation is, as we have already seen, 250 lbs. per annum; but that is for the best milkers of a very superior stock, and although it may be difficult to reach that quantity in any other than a very select dairy, yet there can be little doubt that, with proper attention to breed and feeding, the Epping average may be maintained.

The same gentleman calculates that 28 gallons of milk produce 24 lbs. of cheese, which presuming, as he does, that each cow gives a thousand gallons in the year, would give 857 lbs. of cheese,‡ and Mr. Ratston, another eminent Scotch dairyman, quoted by Mr. Aiton, says "that he would not keep a cow on his farm that did not yield her own value, or her weight, in sweet-milk cheese every year."

The average product of *full-milk cheese* in the best English dairies, where the whole milk and cream are used, cannot, however, be estimated at more than four cwt. In Leicestershire, indeed, and on other deep grazing soils, that carry heavy stock, a well managed cow is reckoned to make from three to five hundred, long weight of 120 lbs.,§ besides supporting her calf until it can be weaned; but such cows require full three acres of the best meadow, for summer and winter keep, and it is not in the power of every farmer, if he even have the stock, to procure such land to maintain them. In Somersetshire, the average is four cwt. and a half;|| in Essex, not so high;¶ and Mr. Marshall states that of all the midland counties at something more than three cwt.**

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* See the Report of the Gloucestershire Farms, No IV. in the twenty-first number of the Farmer's Series of the Library of Useful Knowledge.

† In the Sussex Agricultural Survey there is an account of the produce of the Duke of Richmond's dairy; from which it appears that the cows, all Suffolk, produced an average of only 136 lbs. in the season; but it does not mention how they were fed; probably they were pastured in the park.

The same survey mentions a Sussex cow, that for some weeks after calving gave ten pounds of butter, and twelve pounds of cheese per week; and another is mentioned in the Hampshire Report that yielded from fifteen to sixteen pounds of butter, during part of the season: besides many other instances of equally extraordinary produce.

* Essex Agricultural Survey, Vol. II. p. 289.

‡ *Dairy Husbandry, p.* 53. It is much to be regretted that Scotch writers on husbandry do not take the trouble to reduce their provincial weights into the common standard. Three different ones are in use, and unless they are distinctly specified, much confusion is occasioned in calculations: Mr. Aiton's words are "fifty-five pints (*Scotch*) will produce one stone (*county weight*) of full milk cheese." Now the above calculation is grounded on the Scotch pint containing two English quarts, and the Ayrshire stone 16 lbs. of 24 oz. but in some places the pound consists of only twenty-two ounces and a half.

§ Leicester Agricultural Survey, pp. 154 and 227. Cheshire do. p. 271.

|| Somerset Agricultural Survey, 3d Edit. p. 251.
¶ Essex Agricultural Survey, Vol. II. p. 271.

**Rural Economy of the Midland Counties, 2d Edit. Vol. I. p. 326.

Suckling is generally considered the least profitable, as well as the most precarious, both from the accidents to which calves are liable, and the more variable price of veal than of butter and cheese: but it is also the least troublesome; and probably that and the making of butter combined, are the most advantageous; as thus: supposing a steady weekly demand for butter throughout the year, then the most advisable plan might be, to keep such a number of cows as would supply that demand during the winter; and in summer, when butter is cheap and veal in demand, to apply the extra milk, beyond the quantity required for the usual consumption of butter, to suckling calves, either for the market, or for stock, as may best suit the ulterior views of the farmer. This must, however, depend on the situation of the farm; for that may not always afford an opportunity for the acquisition of a succession of calves for suckling, or a market for them when fat; or it may not be adapted for the rearing of stock; and in such cases, the best application of the skim-milk is either to feed pigs, or to make skim-milk cheese. The usual time required for fatting calves for the butcher has been already stated to be ten to twelve weeks;* perhaps less in summer, when the milk is abundant and rich; and more when it decreases in quantity and quality. But as the calf does not require the entire milk of the cow which has calved it, for some weeks after its birth, the cow will, for a short period, support two; and two cows, calving at different periods, may be calculated to fat seven calves between them in the year. Compared with *grazing*, every branch of dairy-husbandry will probably be found the most profitable; but the trouble and difficulty of management so far exceeds the mere feeding of cattle for the shambles, that it can only be carried on, in most instances, to a much more limited extent. It has also the superiority in other points of considerable importance on farms where the mixed system of tillage and grazing is adopted; that it does not require so rich a soil as that for fatting beasts, and that it produces food for pigs, or calves, and thus, by nourishing more animals, creates additional manure and a profitable consumption of the crops on the spot. It has been calculated, that the herbage which will add 112 lbs. to the weight of an ox, will enable a dairy cow to yield 450 gallons of milk; which, upon reference to our previous statements of the average produce of milk in butter, cheese, or veal, and pork, will be found to exceed the return in meat, after making every fair allowance for the additional expense of management. Mr. Aiton estimates it at more than double;† but his statements have been combated, and, to that extent at least, are certainly questionable.

In *feeding pigs*, it has been found that four cows will, in the season, fat a pig of forty pounds weight, to twelve score, which is fifty pounds each cow, besides keeping the calves until weaned: and pigs, it may be remarked, have been fattened to great weights upon milk alone.

Some dairymen allow two hogs to five cows, also rearing the calves; but experience proves, that two cows will support a two year old hog until he is put up to fatten. In the neighborhood of a good market, it will, however, be most profitable to fatten porkers.

Of *skim-milk cheese*, the quantity may be calculated at two cwt. from each cow; but in comparing the two modes of employing the milk, there must be deducted from the product of this application of it the value of the dung that would have been made by the pigs.

Throughout the system of dairy management, the vigilant eye of the principal ought carefully to pervade; as it rarely happens that servants are to be found who will give that minute attention to every particular, which is so indispensably necessary to ensure success. On this account, it is more likely that a dairy-farm of a moderate size—one for instance that will keep ten to twenty cows—will, if well managed, afford a larger proportionate profit than one of a greater extent; because, in the former case, the farmer's wife and daughters can more easily superintend, or perhaps perform a considerable part of the dairy operations themselves; and this always better done by them than it can ever be expected to be by hired servants. No branch of husbandry, in fact, deserves and requires such unremitting attention. "If," Sir John Sinclair very justly remarks, "a few spoonfuls of milk are left in the udder of the cow at milking—if any one of the implements used in the dairy be allowed to be tainted by neglect—or if the dairy-house be kept dirty, or out of order—if the milk is either too hot or too cold at coagulating—if too much or too little rennet is put into the milk—if the whey is not speedily taken off—if too much or too little salt is applied—if the butter is too slowly or too hastily churned—or if other minute attentions are neglected, the milk will be in a great measure lost. If these nice operations occurred only once a month, or once a week, they might be easily guarded against; but, as they require to be observed through every stage of the process, and almost every hour of the day, the *most vigilant attention* must be kept up throughout the whole season. This is not to be expected from hired servants. The wives and daughters of farmers, therefore, having a greater interest in the concern, are more likely to bestow that constant, anxious, and unremitting attention to the dairy, without which it cannot be rendered productive."*

* See Book I. Chap. VII.

† Dairy Husbandry, p. 171.

* Sir John Sinclair on the Husbandry of Scotland, Vol. II. p. 124.

From St. John's Egypt.

VISIT TO THE EGG-HATCHING OVENS OF CAIRO.

The hatching oven consists of a suite of small square chambers, or cells, arranged on either side of a small passage, in which they open; the doorway, when there are eggs within, being closed with mats. In some of the chambers the eggs had been newly put in, and were perfectly white; in others, having already undergone many changes, they exhibited a dirty yellow color; while in several cells, the embryo having been warmed into life, had shattered its prison, and was emerging through the broken shell. Nothing is more common than the process of incubation, which, in fact, falls under the eye of every man; and the principle of the Egyptian hatching ovens, in which a heated atmosphere performs the office of the hen, is also generally understood; yet I could not behold without admiration a thick stratum of eggs, acted upon by an invisible fluid, bursting into spontaneous motion, rolling against each other, cracking, opening, and disclosing each an organized and animated being. As soon as the chickens are out of the shell, they are carefully removed into the passage, which is divided into numerous compartments by small ridges of clay; from whence, when a few days old, they are drafted off into cooler quarters. The passage, at the time of our visit, was filled with chickens; of which there must have been many thousands, not more than one day old, chirping, moving about, and nestling against each other. Stones placed at intervals, like stepping stones in a brook, enabled us to traverse the several compartments. A number of low subterranean cells, in which an equal temperature is maintained by fires of dung, communicate a sufficient heat to the hatching rooms by apertures in the floor. Few persons can endure, for any length of time, the intense heat of these ovens. We were glad to make our escape; and, on issuing forth into the streets, after making our saucy Arab a handsome present, we found the atmosphere of Cairo, at noon, cool and refreshing. Respecting this process, many erroneous ideas are prevalent in Europe. It has been supposed that the secret, as it is termed, is known only to the inhabitants of a few villages in the Delta, who, dispersing themselves over the country in autumn, undertake the management of such eggs as are entrusted to their care; but there is no secret in the matter, and the eggs are thus hatched by the inhabitants in all parts of Egypt. In the oven we examined there were at least twenty cells, each, perhaps, containing five thousand eggs; so that, should they all take, one hundred thousand chickens would be produced in twenty-one days; or one million seven hundred thousand per annum, supposing the process to go on without intermission. Two hundred similar ovens, kept in constant operation, would therefore hatch, in the year, three hundred and forty millions of chickens!! so that were this practice introduced into England, it would very speedily reduce the price of poultry.

From the Vergennes Gazette.

MANAGEMENT OF (IRISH) POTATOES, TO PRODUCE CROPS UNUSUALLY LARGE.

Mr. Blaisdell—In your paper of the 21st December last, I published the result of some experiments made during the season, in growing potatoes. The quantity produced was such as to cause considerable excitement with agriculturists, and I have been called on by public journals and private letters from Maine to Georgia and from Quebec to Malden, for information respecting my manner of cultivating them. The respectability of the sources from which these inquiries emanate, and the very polite and flattering terms in which they are expressed, forbid the idea of refusal. I therefore embrace the first opportunity my health admits of attempting to gratify their wishes, to the extent of my limited powers.

From the remarks of some of my correspondents I am inclined to believe they misconstrued the statement made in the publication above alluded to. By reference to the statement it will be found that I did not say, or expect to be understood by field culture, that 1,800 bushels of potatoes would be raised upon an acre. I then said as I now say and believe, that 1000 bushels can be grown upon a single acre at less than half the expense and labor they are produced from four in the common manner of culture.

Preparation for planting.

Whatever soil may be selected for this purpose to insure a large crop, it should be highly manured with compost, decomposed vegetables or barn-yard manure, the latter I consider preferable when it can be obtained with convenience; if raw or coarse be made use of, it should be spread immediately before the first ploughing, on the same day, to prevent the evaporation of its best qualities, which will rapidly depart if left exposed to the sun and atmosphere.

The first should be deep ploughing, and may be done as early as suits the convenience of the cultivator. If a stiff marl or clay soil, it would be well to have it ploughed late in the fall previous to planting. Where compost or other substances not liable to fermentation are intended as a manure, it is better the spreading should be omitted until just before the last ploughing, after which it should be thoroughly harrowed fine and smooth as possible, then take a narrow light cultivator, or small plough, calculated for turning a deep narrow furrow, with this instrument lay your land in drills, twenty inches asunder and four inches in depth, running north and south if practicable, to admit the rays of the sun to strike the plant equally on both sides; put into the bottom of the furrows or drills about two inches of well rotted barn-yard manure or its equivalent, then drop your potatoes, if of the common size, or what is more important, that they contain about the usual quantity of eyes; if more, they should be cut to prevent too many stalks shooting up together. Put a single potato in the drills or trenches 10 inches apart; the first should remain uncovered until the second one is deposited. Place them diagonally in the drills, which will afford more space between the potatoes one way, than if laid at right angles, in the rows. The covering may be performed with a hoe, first hauling in the furrow raised on each side the drill, then carefully take from the centre of the space the soil to finish the covering to the depth of 3½ or 4 inches. By taking the earth from the centre of the space on either side, to the width of three inches, it will leave a drain of six inches in the centre of the space, and a hill of 14 inches in width, gently descending from the drill to the drain; the width and depth of the drill will be sufficient to protect the plant against any injurious effects of a scorching sun or drenching rain. The drains in the centre will at all times be found sufficient to admit the surplus water to pass off. I am not at all tenacious about the instrument to be made use of for opening the trenches to receive the manure and potatoes; this work should be well done, and may be performed with a common hoe, with much uniformity and accuracy, by stretching a line to direct the operation: it is true that the labor cannot be performed with the same facility as with a horse, but it can be better done, and I think at less expense, taking into consideration the labor of the man to hold, the boy to ride, and the horse to draw the machine.

Dressing, hoeing etc.

When the plant makes its appearance above the surface, the following mixture may be used: For each acre, take one bushel of *plaster* and two bushels good ashes and sow it broad cast as even as possible. A moist day is preferable for this operation—for want of it a still evening will do.

I consider this mixture decidedly more beneficial and much safer than plaster or ashes alone. The alkali and nitre contained in the ashes lose none of their fertilizing qualities in a moist season, and the invaluable properties of the *plaster* are fully developed in a dry one, by decomposing the atmosphere and retaining to a much later period in the morning the moisture of the evening dews. There are but few plants in our country that receive so great a share of their nourishment from the atmosphere as the potato. The time for dressing or hoeing will be found difficult to describe and must be left to the judgement of the cultivator; it should however, in all climates be done as early as the first buds for blossoms make their appearance.

The operation of hilling should be performed once and *once only* during the season, if repeated after the potato is formed it will cause young shoots to spring up, which retards the growth of the potato and diminishes its size. If weeds spring up at any time, they should be kept down by the hand or hoe, which can be done without disturbing the growing stalk.

My manner of *hoeing* or *hilling* is not to haul in the earth from the spaces between the hills or rows, but to bring on fresh earth sufficient to raise the hill around the plant $1\frac{1}{2}$ or 2 inches. In a wet season, the lesser quantity will be sufficient; in a dry one the larger will not be found too much. The substance for this purpose may consist of the scrapings of ditches or filthy streets, the earth from a barn-yard that requires levelling, where convenient it may be taken from swamps, marshes, the beds and banks of rivers or small sluggish streams at low water. If planted on a clay soil, fresh loam taken at any depth from the surface, even if it partakes largely of fine sand, will be found an excellent top dressing. If planted on a loamy soil, the earth taken from clay-pits, clay or slaty soil will answer a valuable purpose; in fact, there are but few farms in the country but what may be furnished with some suitable substance for top dressing if sought for. The hoeing and hilling may be performed with facility by the aid of a horse and cart, the horse travelling in the centre of the space between the drills, the cart wheels occupying the two adjoining ones, thereby avoiding any disturbance or injury to the growing plants. The time for collecting the top dressing may be regulated by the farmer's own convenience; the earlier the better. Deposited in large piles in or near the potato field, is the most suitable place for distribution.

I have frequently tried bed-planting, (or planting in beds) with uniform success. On moist lands in a stiff or heavy soil, I consider it preferable to any other mode; to do it properly lay your land in beds of from 10 to 20 feet in width, raised in the centre with a plough by back furrowing, after the last harrowing which should be thoroughly done is performed and left crowning with a gradual descent from the centre to the alleys; the proper width and heigth of the beds must depend on the situation of the land and may be regulated by the judgement of the cultivator. In clearing the alleys, which need not exceed 16 or 18 inches in width, the laborer should stretch two lines the proper distance on each side the alley and throw upon the beds with a shovel the earth necessary to be removed.

The use of lines may be by some considered a useless expenditure of labor—not so—the regularity and neatness of appearance will be an abundant remuneration for the trifling time occupied in stretching the lines.

After the land is prepared for planting, strike it out in drills or trenches as before directed; 12 inches asunder, in these drills, drop the potatoes 12 inches a part (diagonally,) to be covered, hoed, dressed and managed in the same manner as in field culture, with the exception of making an undrain in the spaces between the drills, which is unnecessary and should be avoided. In filling the trenches, dressing, &c. the horse-cart must be dispensed with and a hand-cart or wheelbarrow substituted.

In recommending the drills north and south in field planting, I did not wish to be understood that other more valuable considerations should be abandoned for this practice: it is desirable it should be so where the level or moderate descent of the land will admit of it, but if too steep and liable to wash, care should be taken to avoid this evil by running the drills in such direction as may be required to maintain a proper descent, even if it should be necessary to run them in curved lines, or wind around a steep hill to preserve the required descent to admit the surplus water to pass off.

In communicating my experiments to some of my neighboring farmers who are always in a hurry and run over with the plough two acres of land in half the time required to do justice to one; their reply generally is, that my tedious mode of cultivation has too much *piddling* and small labor for patience, and persist in their accustomed manner of half ploughing, half planting and half hoeing five acres of good land and not obtain more potatoes than one, properly cultivated, would produce, thereby losing half their labor and seed, besides the use of four acres of their best land, which might be converted to other valuable purposes.

I should think that intelligent farmers by a little reflection would perceive the folly of pursuing the usual wasteful practice of planting potatoes in rows and hills four feet asunder, having four-fifths of their land unimproved and subject to a rapid waste of its most fertilizing qualities by being nakedly exposed to the washing of drenching rains and the evaporation of the atmosphere; and after all their labor, may consider themselves fortunate if they obtain 200 bushels to the acre, which exceeds the average yield in this section of country. By pursuing the course I have recommended, in ordinary seasons on a good soil you may rationally calculate on a crop of from 800 to 1200 bushels to the acre.

To such farmers as complain of my tedious and piddling mode of culture I have only to remark, if they will *piddle* their land in the same manner, even if they waste half their crop, they will find themselves richly rewarded for their whole labor, in the benefits they derive by this preparation in succeeding crops. I would also add that I believe it generally acknowledged, that rotation in most kinds of crops is desirable, but none more necessary than potatoes, even a second crop on the same ground well prepared will be found to degenerate in quality and quantity.

Location.

The district of country in North America best adapted for their growth, taking into consideration quantity and quality, is situated between the 2d and 10th degrees of east longitude (from Washington) and between the 42d and 50th degrees of north latitude; they are grown to a very considerable extent much farther north, south, and west, but in diminished quantities and inferior qualities.

Soil.

A rich marl or clay is perhaps the most productive; a strong moist loamy soil, (the newer or less it has been cultivated the better) is the most convenient and least expensive soil to grow them on. Most soils common to our country will produce them in great abundance and perfection, the more rapid the growth, the better the quality.

Season for planting.

In this respect they are a most accommodating crop, allowing the farmer in the southern and central part of the designated district, 20 or 30 days to perform the operation: the particular part depends in a very considerable degree upon the climate. In the region of my residence, the 44th degree of north latitude, they may be planted from the 10th of May to the 15th of June. At the extreme north of the described limits less latitude is afforded for seed time and harvest. The good husbandman in that climate should make all practicable preparation for his crop in the fall, and plant as early in the spring as the ground is sufficiently dry and warm; here the growth is extremely rapid, not requiring more than from 90 to 110 days to perfect it; the quantity will not be quite so great as with us, but superior in quality.

Kind of seed to be planted.

This is a question of too much difficulty for me to answer satisfactorily to myself, or instructive to the numerous inquiries of my correspondents; the kinds and qualities in a single neighborhood are too numerous and their names too local and variable to admit of an intelligent reply.

The female of this plant, like most of her sex, is so jealous of her rights and privileges and so tenacious of cultivating a friendly intercourse and connexion with the neighbors, that the blossoms in fields at 200 yards distance, planted of different kinds of seed, are frequently found contributing liberally with each other, by the aid of a gentle breeze, a portion of their generating *Farina*, which is generously received and kindly nourished; the product of this connexion strongly partaking of the properties and appearance of both, many of them in apparent equal parts. Plant this mixture a few years in a place of safety and it will be found that the weaker plant will gradually yield to the stronger, until the one most productive and best suited to the climate will be produced in its original and unadulterated purity. The fact goes far in satisfying me of the cause of our frequent disappointments in not finding seed at all times producing its kind. We have abundant means with a little care and patience of supplying ourselves with every variety of potatoes, the growth of which is adapted to our climate.

The wise provider of all good things has kindly furnished us with the means of providing ourselves with innumerable kinds and qualities of this vegetable. The ripe balls or seeds from a single stalk, will produce by three seasons' planting, almost countless varieties of every color, shape, size and quality, which the country has heretofore produced, and something new, in addition.

The first season's planting they will be small and tender, the second larger, and the third of suitable size for field planting.

The only answer I can give to the inquiry for the right kind of seed, is to recommend to the farmer that kind to be procured in the vicinity, most productive, except a small quantity if he possesses them, of a superior quality, for table use. In changing seed, which will occasionally be found beneficial, if removed from any considerable distance, should be taken from the north: the growth will be more rapid, consequently, the quality better, and in southern climates the quantity greater for the first season, at least.

Time for gathering

This ought to be done when the potato is ripe and not before. The idea so generally entertained that an early frost which nips the top and destroys the vine, prevents the further growth of the potato is a mistaken one, and ought to be exploded; on the contrary, if it has not at this time attained its full size and weight, it grows more rapidly; the nourishment required for sustaining the top is transferred to the root. From a knowledge of this fact, satisfactorily tested, I am inclined to believe that by clipping the bushy part of the top with a scythe or other instrument, after the ball has attained its full size, the crop would be greatly benefited by the operation. I have made a few experiments of the kind, all tending to confirm my belief, but not sufficient to warrant me in making the broad unqualified assertion of the positive correctness of my opinion. I hope agriculturists in different sections of the country will lend a helping hand to aid in testing the correctness or incorrectness of my doctrine in this particular. The green tops are excellent food for cattle or swine; if left on the field will produce no injury, but serve to enrich the soil.

Housing and wintering.

The erroneous practice pursued by our best farmers generally, induces me to state the manner I have pursued for years with unvaried success. To preserve 5 or 600 bushels, I make a box or bin four feet wide, three feet high, and sufficient length to contain the required quantity—have the joints well fastened and made as tight as possible, put into the cellar on skids, raising it three or four inches from the cellar bottom; if the potatoes are intended to be taken out at different times, two or three partitions should be put in cross wise of the bin, to prevent such as are not required for immediate use from exposure to the atmosphere. After this preparation is completed, the next operation is gathering and housing them. Here I must again dissent from the usual practice of farmers generally; instead of leaving them in the sun and wind to dry, after digging, in small parcels, in carts or heaps, they should be immediately covered with the tops or something else, even if they remain in the field but a few hours. This destructive practice, I think must be entirely attributable to want of reflection. It is the sole cause which produces the evil so much complained of, by us called, the watery potato; by the Irish, the winded potato: destroying not only the flavor, but a great portion of its nutriment. In fact, sun, wind and rain, are as destructive to a fresh dug potato, as moonlight is to a fresh caught fish. When our potatoes are removed to the cellar, put into the bottom of the bin two inches of fresh earth, then fill your apartment with potatoes, within three or four inches of the top, immediately cover it with tough grass turf, cut up with a spade a little dove tailing, to the thickness of three or four inches: cover them with the turf, grass side up, packed close and pounded down with a wooden mall, to exclude as much air as possible. In this manner in a cellar of suitable temperature, they may be kept fresh and good for a year, without germinating. No danger is to be apprehended of having too much dirt sticking to the potatoes, it assists in preserving them; an occasional sprinkling of fresh earth amongst them will be found serviceable.

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A. W. BARNUM.

Vergennes, March 13, 1835.

Extracts from an Essay by M. Arago in Jameson's Philosophical Magazine.

ON ARTESIAN WELLS.

Depths of the most remarkable Fountains which have been opened by the hand of man.

We have already alluded to pits sunk by the Chinese to the depth of 1800 feet, in the province of Kia-ting-fou, by which they hoped to procure a supply of salt water; but as no water ascended the pits, we cannot rank them in the list of wells properly so called.

The seventh sheet of water, found near Saint Nicolas l'Aliermont, was at the depth of 1030 feet. The water from it rose to the surface. As it was not water, but coal, that was sought for, the works were abandoned; and the only result that remained, was the formation, without intending it, of a copious fountain, whose waters issued from a source more than 1000 feet deep.

The pit recently sunk at Geneva to the depth of 682 feet, has not reached any body of water which has a tendency to rise.

At Suresne, near Paris, the residence of M. Rochschild, the Messrs. Flachat have worked a pit, previously begun by M. Mulot, to the depth of 663 feet. This pit has now penetrated the chalk to the extent of 537 feet. The work has been suspended, when there is only 60 feet more of the chalk formation remaining, upon penetrating which, there would be every prospect of finding water. The desirableness of prosecuting the research is most apparent.

The fountain of Cheswick, in the Duke of Northumberland's park, projects its water about a yard above the surface of the soil, and comes from the depth of 582 feet.

The deepest fountain in the department of Pas de-Calais is situated between Béthune and Aire. Its waters project seven feet above the ground, and come from a depth of 461 feet.

The artesian well which affords such an abundant supply in the cavalry barracks of Tours, is fed by a body of water which M. Degousée found at the depth of 259 feet. The water of another well, which was finished in 1834, in the silk manufactory of M. Champoiseau, springs from a depth of 273 feet.

Concerning the daily issues from some of the principal Fountains.

Belidor has already mentioned, in his Science de l'Ingénieur, a fountain which is situated in the monastery of Saint André, a couple of miles from Aire in Artois, the waters of which rise to the height of eleven feet above the ground-floors, and which furnishes nearly two tons of water per minute.

The well which Messrs. Fabre and Espériquette have sunk, at Bages, near to Perpignan, in the property of M. Duvand, supplies 333 gallons per minute.

The well which M. Degousée had sunk in the cavalry barracks at Tours, measured at six feet above the ground, furnishes 235 gallons per minute.

Of the many wells which exist in England, the one whence, according to my knowledge, there is the most abundant supply of water, is that in the copper manufactory of Merton, in Surrey; its issue amounts to 200 gallons a minute.

The artesian well of Rivesaltes, for which the inhabitants are so much indebted to Messrs. Fabre and Espériquette, engineers, furnishes 176 gallons in the same time.

The well lately sunk near to Lillers, in the department of the Pas de-Calais, with a depth of 140 feet, affords a supply of 155 gallons per minute.

Of Artesian Wells whose waters have been employed as moving powers.

At the village of Gouéhem, near Béthune, four wells have been sunk in a meadow to the depth of 120 feet. The waters which issue from them are converted into the water-course of a flour-mill, and subserve other agricultural processes.

At Saint Pol, there is another mill, the only moving power of which is the water from five projecting fountains.

At Fontès, near Aire, the waters of ten such wells are made to turn the mill-stones of a large mill, as also to blow the bellows and beat the hammers of a nail manufactory.

At Tours, M. Degousée has excavated a well, in the silk manufactory of M. Champoiseau, to the depth of 430 feet, which pours 287 gallons of water per minute into the troughs of a wheel of twenty-one feet diameter. This wheel works the looms of his manufactory.

At Tooting, near London, the fountain of an apothecary puts a wheel of four feet diameter in motion, and this sets a pump to work, which raises water to the top of a house three stories high.

Of the advantage to which industry, in various circumstances, has turned the waters of fountains.

On the present occcasion we need not dilate on the benefits these waters confer on public health, nor on their use in irrigation, &c. &c. We shall only point out their application to a few purposes which are less generally known.

These springs have been put in requisition even in countries where more commcn water-courses are not unfrequent. Their constant and high temperature permits them to be applied to the movement of machinery during the most severe winters, whether it be directly, when they are abundant, or in other cases, only as a means of washing away the ice, which is apt to stop the movement of the water-wheels.

In Wurtemburg, M. Bruckman, by transmitting through metallic pipes, conveniently placed, a current of water, at the temperature of 54° Fahr., which is derived from several natural springs, keeps up a temperature at 47°, in various manufactories where the external cold lowers the thermometer to zero. This is a simple imitation of a plan which has been long practised in the village of *Chaudes-Aigues;* the results, however, are worthy of consideration.

Greenhouses also are in existence, in which the temperature is maintained very equally, by the effects of the constant circulation of a large quantity of water, derived from these sources.

During heavy rains, the work of paper-mills is often interrupted, on account of the impurity of the water. These forced stoppages come to an end, when the constant limpid supply of a projecting fountain can be employed.

In some localities the invariably pure waters of a steady temperature, proceeding from these springs, have been the means of establishing very lucrative artificial cress-plots. The beautiful growth of cresses in those parts of the beds of rivulets where these natural springs existed, has suggested this application. It is positively stated that the artificial cress-plots of Erfurt yield not less than £12,000 per annum.

The very fine lint which is intended for the manufacture of cambric, lawn lace, &c. is steeped in the department *du Nord,* with very particular care. In a single *commune,* between Douai and Valenciennes there are ten or a dozen retting-pools, which are fed entirely by water from the projecting fountain. It has been thought that the purity of these waters, and the invariability of their temperature, by accelerating the solution of the gum-resins, preserve the valuable qualities of the filaments of the lint in the highest degree of perfection.

In fish ponds, the fish are apt to die during the winter, from the severity of the cold, and in summer from the heat. By turning the invariably temperate waters of an abundant artesian well into them, the extreme variations which the seasons induce are prevented. This experiment, it is said, has entirely succeeded in the ponds of St. Gratian, near to Montmorenci.

Caverns into which whole rivers are engulfed.

This phenomenon in a high degree excited the attention of the ancients. Thus even Pliny mentioned as among the rivers which disappeared under the surface of the earth, the *Alpheus* in the Peloponnesus, the *Tigris* in Mesopotamia, the *Timavus* in the teritory of Aquillia, &c. He also ranks the Nile in the same class, for, according to him, it disappears for the space of three day's journey before its entrance into the Cesarian Mauritania, and also to the extent of twenty days' journey upon the frontiers of Ethiopia. Come we now, however, to examples that are nearer to ourselves, better determined, and more known.

The Guadiana loses itself in a flat country in the midst of an immense meadow. Here we have the explanation of the fact, that, when we are speaking with admiration of some superb bridge in France or England, the Spaniards remark that they have one in Estremadura upon which a hundred thousand head of cattle can feed at the same moment.

The *Meuse* disappears at *Bazoilles.* It would appear that it is only in later times that this has been the case, for, according to M. Hericart de Thury, although the original bed is now cultivated, it may be still distinctly traced above the subterranean course.

The *Drôme* in Normandy completely loses itself in the midst of a meadow, in a pit of about thirty feet diameter, known to the inhabitants under the name of the *Fosse de Soucy.* But this engulfing takes place only by degrees; for there are other openings in the same locality which, though they are less remarkable, yet, to use the local expression, *drink up* the greatest proportion of its water.

In the same district of France, the *Rille,* the *Iton,* the *Aure,* and other rivers which might be named, are lost by degrees. There are, from one point to another in the beds of these rivers, great gaps, which are called *bétoirs,* and each of which absorbs a portion of the running stream. On its arrival at the bétoir which entirely drinks it up, the stream is usually reduced to the size of a trifling rivulet.

It would be easy to quote examples such as these, in which rivers entirely disappear from the surface. But how much larger a descent of water would require to be taken into account, if well executed investigations had made known to us all the instances in which there was only a partial disappearance? We shall shortly have an opportunity of remarking that the Loire is one of those rivers in which this occurrence may be observed.

There is often in these stratified formations, distinct sheets of water at different depths. The works which have been undertaken in search of coal, near to Saint-Nicolas d'Aliermont, near Dieppe, have proved that there are seven great sheets of water. Their respective positions are as follows:

1st sheet of water at a depth of	76	feet.
2d, - - -	307	do.
3d, - - -	537	do.
4th, - - -	645	do.
5th, - - -	768	do.
6th, - - -	880	do.
7th, - - -	1030	do.

All these collections of water rushed with great force towards the surface.

During the boring of the wells of the Port Saint Ouen, the Messrs. Flachat encountered five very distinct sheets of water, all of which had the tendency to rise.

The 1st at the depth of			108	feet.
2d,	-	-	138	do.
3d,	-	-	156	do.
4th,	-	-	184	do.
5th,	-	-	206	do.

The same engineers encountered four of these reservoirs of water, whilst boring to the depth of 200 feet at Saint Denis, close to the *Place de la Poste aux Chevaux*.

At *Tours*, the three pools, all having a tendency to ascend, which were met with by M. Degousée, were found below *La Place de la Cathedrale*.

The 1st at the depth of			292	feet.
2d,	-	-	240	do.
3d,	-	-	383	do.

The sinking of pits in the neighborhood of London has brought the same truth to light; and the same remark might be made respecting the United States of America.

Negative Artesian Wells.

Sometimes pits are sunk for the purpose of transmitting into the interior of the earth, water, retained at the surface by strata of impermeable clay or stone, and thereby rendering extensive districts mere morasses, unfit for cultivation. The pits by which descend into the interior of the earth those quantities of water which, without this expedient, remain on the surface, may be called *negative artesian wells.* Necessity, the mother of so many important inventions, early suggested to mankind the idea of imitating nature in this point.

The plain of Paluns, near Marseilles, used to be a great morass. It appeared impossible to drain it by the help of the common surface channels. King René, however, caused a great number of pits or drain-wells to be sunk, which are known in the Provençal language by the name of *embugs* (funnels.)* These pits transmitted, and now transmit, in the permeable strata situated at a certain depth, those waters which made the whole country a barren waste. It is positively stated that it is the waters taken down by these embugs of Paluns, which, after a subterranean course, form the projecting fountains of the port of Mion, near to Cassis.

The river Orbe, in the Jura, which descends from the lake of the Rousses, conveys into lake Joux much more water than evaporation removes from it. This latter lake, whence there issues no river, preserves, notwithstanding, a stated elevation which is nearly uniform. "It is," says Saussure, "because nature has provided for these waters subterranean issues, by which they are engulfed and disappear. * * * * As it is of the greatest consequence for the inhabitants of this valley to preserve these natural drains, without which their arable lands and their habitations would be immediately overflowed, they preserve them with the greatest possible care; and when they perceive that they do not take off the water with sufficient velocity, *they themselves open new ones.* For this purpose, all that is necessary is to sink a pit fifteen or twenty feet, having a diameter of about ten feet, in the thin and vertical strata, the summits of which appear on the surface. The name of *entonnoirs* (funnels) is given to these pits." * * * * "It is," adds Saussure, "the waters absorbed by all these entonnoirs, that are observed to rise from the earth, and form a large spring, which is also called Orbe, at the distance of two miles below the southern extremity of the lake." In this passage of two miles, the absorbed waters descend 680 feet.

A manufacturer of potato starch at Villetaneuse, a small village about three miles from St. Denis, in the winter 1832—3, by means of a pit sunk to the depth of certain absorbing stratified beds, got rid of not less than 16,000 gallons of impure water per day, the stench from which had given rise to serious complaints, which probably would have compelled him to give up his establishment. After six months of daily absorption, nothing was found at the bottom of the pit except sand, and this has been uniformly the case from the first.

* It is the property of absorbing, of drinking up the surface waters, possessed by certain natural and artificial openings, which has given the names of *boit-tout*, of *betoirs* or *boitards*, to these drain-wells in certain districts.

From the Farmer and Gardener.

THE CHENOAODIUM QUINOA.

The plant described below, has been successfully cultivated in and near this city by Mr. Gideon B. Smith, since 1829. In 1830 he presented us with a dish of it, and we can bear testimony to its fine qualities. At the instance of Mr. Smith, a lieutenant in our navy procured two bottles of the seed from a farmer in the mountains some distance from Chili. They were procured in the interior at the suggestion of Mr. Smith, because the article as sold in the shops of Peru but rarely germinates, owing to its having been submitted to a process of heating to destroy the egg of an insect of the weevil kind, which is deposited on it. To this cause it is, that we are to ascribe the ill success which has generally attended the attempts to introduce its culture both in Europe and this country. It has been brought here by our sea captains occasionally since about 1805 or 1806; but has rarely if ever vegetated, and was given up by most who tried its cultivation as impracticable: fortunately, however, it fell to the lot of a man who never tires in the pursuit of science—or in his endeavors to add to the comforts of life—to unfold the mystery of its unfruitfulness, and apply the remedy—and to him our countrymen are indebted, for one of the greatest delicacies of the vegetable family which has been introduced among us for many years.

From the Gardener's (English) Magazine.

Humboldt states (as we have quoted in the *Encyc. of Gard.* 2nd edit., §948,) that this plant, in Mexico, ranks in utility with the potato, the maze, and the wheat. The leaves are used as spinach or sorrel, or as greens; and the seeds in soups and broths, or as rice. Throughout a great part of South America, and especially in Peru, the seeds are in as common use as rice is in Hindostan. The seeds are considered more heating than rice, and on that account they are frequently given to domestic poultry to make them lay early. The plant is an annual, and in general appearance resembles the A'triplex hortensis, or French spinach; and, under the same circumstances of soil, climate, &c., will grow to about the same height as that plant. The seeds are small, yellowish white, round, somewhat flattened, about a line in diameter, and, on a cursory glance, might be mistaken for those of millet. Mixed with the latter seeds, and fermented, a pleasant kind of beer is said to be produced. They are contained in a single envelope, from which they are very easily separated. The *Quinóa* was first introduced into England in 1822; and it has ripened seeds at Kew. No particular notice, however, appears to have been taken of the plant till this season, when it has been grown by A. B. Lambert, Esq., V. P. L. S., at Boyton, where it has ripened abundance of seeds on plants varying from three to seven feet in height. These seeds Mr. Lambert will, no doubt, distribute all over Europe; and, we trust, the plant will now have a fair trial both in gardens and fields. To do any good in producing nutritious seeds, the plant should be subjected to field culture, in which we see not the slightest difficulty. It might be sown very thinly in drills, three feet apart, at about the same season as barley, and the plants afterwards thinned to the distance of one foot apart. There appears at present, no reason whatever why it should not become as common in the fields of Europe as barley, wherever that grain can be cultivated. In the meantime, we hope it will be tried first in gardens, in order to raise abundance of seed for future experiments in the field.

From the Richmond Whig.

PROCEEDINGS OF THE JAMES RIVER AND KANAWHA COMPANY.

Tuesday, May 26.

The meeting of the Stockholders of this Company was continued today, agreeably to adjournment, and was more fully attended than on the day previous, but did not, as was expected, go into the election of officers. Mr. Chapman Johnson, from the Committee appointed on the first day, reported the following resolutions prepared by them which he proposed should, for the present, be laid on the table for examination by those who might wish the opportunity—

1. *Resolved,* That of the three plans of improvement specified in the 22d section of the act, entitled "an act incorporating the stockholders of the James River and Kanawha Company," and by one or the other of which, to be selected at its discretion, the company is charged with the duty of connecting the tide-water of James River with the navigable waters of the Ohio, the stockholders deem it expedient and proper to prefer, and do hereby elect, the first in the order of specifications set forth in said selection; that is to say, by a continuation of the lower James River canal to some suitable point on the river, not lower than Lynchburg, a continued rail road from the western termination of that canal to some convenient point on the Great Kanawha River, below the great falls thereof, and an improvement of the Kanawha River from thence to the Ohio, so as to make it suitable for steam boat navigation.

2. *Resolved,* That, with the exceptions hereinafter specified, the canal shall have a breadth at the bottom of not less than 35 feet, and at the surface of not less than 50 feet, and a depth of water of not less than 5 feet, with a suitable tow-path and guard-bank.

3. *Resolved,* That, the breadth of the canal may, within the minimum limit prescribed by the charter, be modified where local circumstances require it; and more especially in the cases of deep cutting, steep side cutting, embanking, and also where it is supported by walls; but a depth of 5 feet shall be preserved throughout the line.

4. *Resolved,* That the locks shall be not less than 85 feet between the gates, and 15 feet wide, and, with the exception of the gates, shall be built of stone; that the culverts shall likewise be made of stone; that the aqueducts shall be erected on stone piers or pillars, surmounted with a superstructure of wood or stone, as may be deemed most advisable; and that the stone work of the locks, culverts and aqueducts, shall be laid in water cement, and executed in a plain, substantial, and durable style of workmanship, admitting the introduction of cut stone only in such parts where it may be deemed indispensable.

5. *Resolved,* That the dams across the river, in connection with the canal, shall be executed in the most substantial and durable style of workmanship; and the location of the number deemed essential in the commencement, shall, as far as practicable, have reference to the introduction of additional intermediate dams, to be erected in future, with a view to a further command of water, and more extended accommodation to the trade from the opposite side of the river.

6. *Resolved,* That in the ponds or pools of water, occupying a portion of the line, the channel and tow-path shall be so adjusted as to admit of the convenient trackage of boats of not less than 75 tons burthen.

7. *Resolved,* That the canal shall be extended to the town of Covington upon Jackson's river, and shall be divided into three divisions: the first commencing at the city of Richmond, and ending at the town of Lynchburg; the second commencing at the town of Lynchburg, and ending at the town of Pattonsburg; and the third commencing at the town of Pattonsburg and ending at the town of Covington.

8. *Resolved,* That the three divisions of the canal shall be executed in successive order; beginning with the first, and proceeding thence to the second; and afterwards from the second to the third; but during the execution of the first and second divisions, preparations may proceed cotemporaneously in the second and third divisions respectively, so that the work may progress without interruption or suspension.

9. *Resolved,* That the whole line of canal within each division thereof, shall be located and put under contract as soon as practicable from the period for its commencement; but the enlargement of the present canal from Richmond to Maiden's Adventure, with a view to adapt it to the rest of the line, and its connection with the head of the tide, may be deferred till the execution of the first divisions shall be advancing to a close.

10. *Resolved,* That the execution of the line of locks and dams on the Kanawha River, shall be referred to the commencement of the execution of the third division of the canal; at which time the works on the Kanawha River shall likewise be commenced; and these works shall progress simultaneously with those on the third division of the canal; so that the line of steam boat navigation on the Kanawha River shall be completed up to the falls thereof, at or about the time that the canal navigation on the James and Jackson's Rivers shall be completed up to the eastern end of the turnpike road at the town of Covington.

11. *Resolved,* That the execution of the rail road from the town of Covington to the falls of Kanawha, shall be deferred until after the execution of the water parts of the line.

12. *Resolved,* That the execution of the line of improvement shall be commenced as soon as practicable, by the commencement of the first division of the canal, and continued in the manner and orded prescribed, till otherwise directed by the stockholders.

13. *Resolved,* That until the further order of the

stockholders, the plan of the canal and of the rest of the works, in points not heretofore enumerated, or not fully explained, shall, along with their execution, be confided to the charge and discretion of the President and Directors of the Company.

The adoption of the resolutions was opposed at some length by Messrs. Philip Norborne Nicholas and Wyndham Robertson. It was obviously of the utmost importance that the most judicious of the different modes of effecting the improvement in view, authorised by the charter, should be adopted before it should be commenced; as an error in the outset could not be remedied but at an immense expense. But the question, whether the canal or rail road system of improvement, generally, was preferable, was one on which the most distinguished engineers differed; and the like diversity of opinion as to whether the present work should be by rail road, wholly, or by canal, so far as practicable, obtained among the engineers, who had applied their minds to this particular subject. It was impossible, therefore, they contended, that the stockholders, to many of whom the question had never before been presented, could, at this time, come to a judicious decision; and they preferred that the company should first of all be organized by the appointment of officers, whose duty it should be to collect the best information, and digest a plan, to be laid before the stockholders, for acceptance, at some future meeting. Mr. Robertson concluded his remarks by offering the following resolutions, as a substitute for those presented by the committee:

Resolved, That the President and Directors of the James River and Kanawha Company, proceed as early as may be practicable, to examine and consider the question of the most eligible mode of improvement authorized by the charter, for the country between the city of Richmond, and such point as said President and Directors may deem most suitable for the head of canal navigation, keeping in view the great ends proposed to be attained by the work contemplated, viz: public accommodation and the profits of the stockholders.

That should the examination of the various reports, surveys, profiles, and estimates heretofore made in reference to the improvement of the communication between the points indicated, and now the property of this company, and of all such other data, as they may be able to command, not enable the said President and Directors to arrive at a conclusion satisfactory to themselves of the question proposed for their consideration, or should they for any cause deem it advisable, the said President and Directors shall be at liberty to call to their aid one or more civil engineers, the most eminent to be procured, to perform such services as said President and Directors, may require; the expense thereby incurred to be defrayed out of the funds of the company.

That having thus duly possessed themselves of all the information within their reach calculated to shed light on this interesting inquiry, and duly weighed the same, it shall be the further duty of said President and Directors to digest the same into the form of a report, wherein they shall present, as fully and fairly as they can, all the considerations that recommend or forbid the adoption of each of the alternative modes of improvement authorized by the charter, together with the conclusions to which, on a view of the whole ground, they shall themselves have arrived.

That the said President and Directors cause copies of said report to be printed in pamphlet form, as soon as the same shall have been prepared, and take such means as to them may seem best for transmitting one copy thereof to each stockholder in said company.

That the said President and Directors call a general meeting of the stockholders of said company within days after the publication of said report, to take said report into consideration.

Some discussion followed between Messrs. Joseph James, Chapman Johnson, Sidney S. Baxter, David I. Burr, and Fleming James; in the course of which a general call was made for the reasons of the committee for the resolutions which they had presented.

The call was responded to by Mr. Joseph C. Cabell, who gave a brief history of the rise and progress of the project about to be put in execution, from its inception in 1810 to the present time, adverting to the various surveys, reports, and discussions had upon the very subject during that period, and contending that in these several ways ample opportunity had been given to all who felt interested in the matter, to acquire the requisite knowledge in reference to it. He referred also to various investigations of the relative merits of the canal and rail road systems, which had taken place in other states—the result of all which, as well as the surveys, reports and discussions above alluded to, was in his opinion, conclusive in favor of the system selected by the committee. In addition to this weight of authority, he professed himself ready to go into the discussion of the question on its own merits; but owing to the lateness of the hour, contented himself with citing a summary of the arguments of Mr. Mercer in his report to congress in 1832, and with stating the following "objections to the substitution of a continuous rail road for a canal in the valley of the James and Jackson Rivers:"

1. That the preference of a continuous rail road will cause the loss of nearly the whole amount of capital invested in the lower James River canal, and the canal at the Blue Ridge.
2. Transportation would be more expensive, in the proportion of at least two to one.
3. It would be the means of exchanging a free highway for a close monopoly.
4. The property transported would be more exposed to damage.
5. Transportation on rail roads is inconvenient for many heavy articles.
6. The adoption of a continuous rail road would cause the loss of the water power of the rivers connected with a canal, and of the valuable estate held by the company in the waters of the rivers, as well as of the manufactories, towns and villages, to result from the water power to the community at large.
7. That a continuous rail road would be more exposed to the danger of competition in the vicinity and at a distance.
8. That the two species of improvement possess each its peculiar advantages, neither possessing all the advantages of the other, and both being necessary *ultimately* to the prosperity of the central line; and that the adoption of a continuous rail road would preclude a canal, whilst the adoption of a canal would not necessarily preclude a rail road.

The discussion was continued a short time further by Messrs. Nicholas, Burr and Carter Harrison, when the resolutions and substitute were laid on the table and ordered to be printed; and the meeting adjourned till 12 o'clock to-morrow.

Wednesday, May 27.

On Wednesday evening, after a recess, the stockholders again convened, when the discussion of the committee's resolutions and Mr. W. Robertson's substitute was resumed, and continued by Mr. C. Johnson for the former, and Messrs. J. James, P. N. Nicholas, J. B. Harvie, and W. Robertson, until about 8 o'clock. The question on the adoption of the substitute was then put, and being regarded as a test question, the ayes and noes, according to the stock represented, were ordered; and the same being called, the substitute was rejected, ayes 450, noes 6820—including the vote of the state, and of the corporations of Richmond, Lynchburg and the Bank of Virginia.

The first six resolutions reported by the committee were then taken up in succession, and after a few remarks by Mr. J. C. Cabell in support of each, were adopted by a *viva voce* vote. The first of these, it will be recollected, adopts the plan of continuing the James River canal to some point on the river, not lower than Lynchburg; constructing a rail road from thence to some point on the Great Kanawha River, and improving the navigation of the Kanawha from thence to the Ohio. The others regard the dimensions, and mode of constructing the canal, locks, &c.

On the reading of the seventh resolution which provides that the canal shall be extended to Covington, and be divided into three sections—the first extending from Richmond to Lynchburg, the second from Lynchburg to Pattonsburg, and the third from Pattonsburg to Covington—Mr. John Robertson opposed its adoption, on the ground that it was inexpedient for the stockholders to commit themselves, at this time, to the continuation of the work by canal, in preference to a rail road, west of Lynchburg, inasmuch as it was obvious that that part of the improvement could not be undertaken until a year or two hence, when the experience acquired during the construction of the canal to that point, with other future contingencies, might incline the company to substitute the rail road system from thence to Covington. After some discussion on this point, principally between Messrs. J. Robertson and J. C. Cabell, the subject was laid on the table, and at half after nine the meeting adjourned till 10 o'clock yesterday morning, [28.]

Yesterday, agreeably to adjournment, the meeting convened, when Mr. J. Robertson proposed the following, as a substitute for the seventh resolution of the committee, viz:

Resolved, That it is expedient to continue the Lower James River canal to the town of Lynchburg, and that the line of the said improvement should be located and put under contract with all practicable despatch.

Resolved, That it is unnecessary and inexpedient, at this time, to prescribe any specific plan for the residue of the work authorized by the charter of the company for connecting the eastern and western waters.

Resolved, That the President and Directors of the James River and Kanawha Company, proceed, without delay, to consider the different modes of improvement which may be proposed, or which may suggest themselves to their minds as worthy of examination, for the residue of the work, calling to their aid one or more able engineers, and report to the stockholders, at their next stated or regular meeting, the plan deemed by them most eligible for the said improvement, with a full and detailed statement of the reasons and considerations which may have recommended such plan to their adoption.

These resolutions were supported by Messrs. J. Robertson, P. N. Nicholas, and J. B. Harvie, and opposed by Mr. J. C. Cabell, in a debate of some length. Finally, on vote taken, they were rejected. The seventh resolution of the committee was then adopted.

On the reading of the eighth resolution, prescribing the order in which the three divisions of the canal shall be executed, Mr. J. B. Scott, proposed the following by way of substitute.

Resolved, That the execution of the work shall commence at the town of Covington, on Jackson's River, and be prosecuted eastwardly to the town of Lynchburg, and thence to the city of Richmond; and that contracts for the construction of the rail road from the town of Covington to the falls of Kanawha, shall be made simultaneously with the commencement of the other part of the work.

After a discussion of considerable length, in which the substitute was supported by Mr. Scott and opposed by Messrs. Chapman Johnson and James Lyons, it was rejected. Thereupon, the 8th, and the remainder of the resolutions reported by the committee, were adopted.

Mr. C. Johnson from the committee, then reported a series of by-laws for the regulation of the company, which were laid on the table, and the meeting agreed to a recess until five o'clock, P. M.

On Thursday evening, after a recess, the meeting re-assembled. The by-laws, reported by the committee, having been amended, were adopted. The meeting then proceeded to elect the following officers:

Joseph C. Cabell of Nelson, President, (unanimously elected.)

Directors:
Sidney S. Baxter of Richmond City,
Samuel Mark of Richmond City,
Richard Sampson of Goochland,
Randolph Harrison, sen. of Cumberland,
John H. Cocke, Sen. of Fluvanna,
John Early of Lynchburg, and
Hugh Caperton of Monroe,

The Chairman having delivered the several books and documents, lying on the table, into the hands of the President elect of the company, the meeting adjourned, *sine die*.

From the Library of Useful Knowledge—Farmer's Series.

PRINCIPLES OF BREEDING. MANAGEMENT OF MARES AND THEIR FOALS.

This may be a proper period to recur to the important subject of breeding, particularly important when there cannot be a doubt that our breed of useful horses has, within the last twenty years, most materially degenerated. Our running-horses are not much lessened in excellence and value; but our hunters and hackneys are not what they used to be. We shall endeavor to point out the cause of this.

Our observations must be of a general nature, and will be very simple; and the first axiom we would lay down is, that "like will produce like," that the progeny will inherit the qualities, or the mingled qualities, of the parents. We would refer to the subject of diseases, and again state our perfect conviction, that there is scarcely one by which either of the parents is affected, that the foal will not inherit, or, at least, the predisposition to it: even the consequences of ill usage or hard work will descend to the progeny. We have already enlarged on this, but its importance will be a sufficient apology for the repetition. We have had proof upon proof, that blindness, roaring, thick wind, broken wind, spavins, curbs, ringbones, and founder, have been bequeathed, both by the sire and the dam, to the offspring. It should likewise be recollected, that although these blemishes may not appear in the immediate progeny, they frequently will in the next generation. Hence the necessity of some knowledge of the parentage both of the sire and dam.

Peculiarity of form and constitution will also be inherited. This is a most important, but neglected consideration; for however desirable, or even perfect, may have been the conformation of the sire, every good point may be neutralized or lost by the defective form, or want of blood, of the mare. There are niceties in this, of which some breeders used to be aware, and they employed their knowledge to great advantage. When they were careful that the essential points should be good in both parents, and that some minor defect in either should be met, and got rid of, by excellence in that particular point in the other, the result was creditable to their judgement, and highly profitable. The unskilful or careless breeder will often so badly pair the animals, that the good points of each will be, in a manner, lost: the defects of both will be increased, and the produce will be far inferior to both sire and dam.

Of late years, these principles have been much lost sight of in the breeding of horses for general use; and the following is the explanation of it. There are nearly as good stallions as there used to be. Few but well formed and valuable horses will be selected and retained as stallions. They are always the very prime of the breed; but the mares are not what they used to be. Poverty has induced many of the breeders to part with the mares from which they used to raise their stock, and which were worth their weight in gold; and the jade on which the farmer now rides to market, or which he uses in his farm, costs him but little money, and is only retained because he could not get much money for her. It has likewise become the fashion for gentlemen to ride mares, almost as frequently as geldings; and thus the better kind are taken from the breeding service, until old age or injury renders them worth little for it. An intelligent veterinary surgeon, Mr. Castley, has placed this in a very strong light, in the third volume of the "Veterinarian," p. 371.

We would wish, then, to impress it on the minds of breeders, that peculiarity of form and constitution are inherited from both parents; that the excellence of the mare is a point of quite as much importance as that of the horse; and that out of a sorry mare, let the horse be as perfect as he may, a good foal will rarely be produced. All this is recognised upon the turf, although poverty or carelessness have made the general breeder neglect or forget it.

It is recognised in the midland counties in the breed of cart horses; and the strict attention which has been paid to it, has brought our heavy horses to almost the same perfection in their way as the blood-horse. It is strange that in our saddle-horses, our hunters, and, to a great degree, our carriage-horses, this should be left to chance. The breeder begins to care little about the quality of the mare, and the progeny is becoming comparatively of little worth. Experience, it is said, will make fools wise, but experience will here be bought at a very dear rate, both as it regards the breeder and the community.

That the constitution and endurance of the horse are inherited, no sporting man ever doubted. The qualities of the sire or the dam descend from generation to generation, and the excellencies or defects of certain horses are traced, and justly so, to some peculiarity in a far distant ancestor.

It may, perhaps, be justly affirmed, that there is more difficulty in selecting a good mare to breed from, than a good horse, because she should possess somewhat opposite qualities. Her carcass should be long, to give room for the growth of the fœtus, and yet with this there should be compactness of form and shortness of leg. What can they expect who go to Smithfield market to purchase a number of worn-out, spavined, foundered mares, about whom they fancy there have been some good points, and send them far into the country to breed from, and, with all their variety of shape, to be covered by the same horse? In a lottery like this, there may be now and then a prize, but there must be many blanks. "If horse-breeders, possessed of good judgement, would pay the same attention to breed and shape as Mr. Bakewell did with sheep, they would probably attain their wishes in an equal degree, and greatly to their advantage, whether for the collar or the road, for racing or for hunting."*

As to the shape of the stallion, little satisfactory can be said. It must depend on that of the mare, and the kind of horse wished to be bred; but if there be one point which we should say is absolutely essential, it is this, "compactness"—as much goodness and strength as possible condensed in a little space. If we are describing the reverse of the common race of stallions for hunters and coach-horses, the fault lies with the bad taste and judgement of the majority of breeders.

Next to compactness, the inclination of the shoulder will be regarded. A huge stallion, with upright shoulders, never got a capital hunter or hackney. From him the breeder can obtain nothing but a cart or dray-horse, and that, perhaps, spoiled by the opposite form of the mare. On the other hand, an upright shoulder is desirable, if not absolutely necessary, when a mere draught horse is required.

It is of no little importance, that the parents should be in full possession of their natural strength and powers. It is a common error, that because a mare has once been good, she is fit for breeding when she is no longer capable of ordinary work. Her blood and perfect frame may ensure a foal of some value, but he will inherit a portion of the worn-out constitution of her from whom he sprung.

On the subject of *breeding in and in*, that is, persevering in the same breed, and selecting the best on either side, much has been said. The system of crossing requires much judgement and experience; a great deal more, indeed, than breed-

* Parkinson on the Breeding and Management of Live Stock, vol. ii. p. 59.

ers usually possess. The bad qualities of the cross are too soon engrafted on the original stock, and once engrafted there, are not, for many generations, eradicated. The good ones of both are occasionally neutralized to a most mortifying degree. On the other hand, it is the fact, however some may deny it, that strict confinement to one breed, however valuable or perfect, produces gradual deterioration. The truth here, as in many other cases, lies in the middle; crossing should be attempted with great caution, and the most perfect of the same breed should be selected, but varied, by being frequently taken from different stocks. This is the secret of the course. The pure south-eastern blood is never left, but the stock is often changed with manifest advantage.

A mare is capable of breeding at three or four years old; some have injudiciously commenced at two years, before her form or her strength is sufficiently developed, and with the developement of which this early breeding will materially interfere. If she does little more than farm-work, she may continue to be bred from until she is nearly twenty; but if she has been hardly worked, and bears the marks of it, let her have been what she will in her youth, she will deceive the expectations of the breeder in her old age.

The mare comes into heat in the early part of the spring. She is said to go with foal eleven months, but there is sometimes a strange irregularity about this. Some have been known to foal five weeks earlier, while the time of others has been extended six weeks beyond the eleven months. We may, however, take eleven months as the average time. In running horses, that are brought so early to the starting-post, and whether they are foaled early in January or late in April, rank as of the same age, it is of importance that the mare should go to cover as early as possible: in a two or three year old, four months would make considerable difference in the growth and strength; yet many of these early foals are almost worthless, because they have been deprived of that additional nutriment which nature designed for them. For other breeds, the beginning of May is the most convenient period. The mare would then foal in the early part of April, when there would begin to be sufficient food for her and her colt, without confining them to the stable.

From the time of covering to that of foaling, the mare may be kept at moderate work, and that not only without injury, but with decided advantage. The work may be continued up to the very time when she is expected to foal; and of which she will give at least a day's notice, by the adhesive matter that will appear about the teats. When this is seen, it will be prudent to release her from work, and keep her near home, and under the frequent inspection of some careful person.

When nearly half the time of pregnancy has elapsed, the mare should have a little better food. She should be allowed one or two feeds of corn in the day. This is about the period when they are accustomed to slink their foals, or when abortion occurs: at this time, therefore, the eye of the owner should be frequently upon them. Good feeding and moderate exercise will be the best preventives against this. The mare that has once slinked her foal is ever liable to the same accident, and therefore should never be suffered to be with other mares about the time that this usually occurs, which is between the fourth and fifth months; for such is the power of imagination or of sympathy in the mare, that if one of them suffers abortion, the greater number of those in the same pasture will share the same fate. Farmers wash, and paint, and tar their stables to prevent some supposed infection:—the infection lies in the imagination.

If a mare has been regularly exercised, and apparently in health while she was in foal, little danger will attend the act of parturition. If there be false presentation of the fœtus, or difficulty in producing it, it will be better to have recourse to a well informed practitioner, rather than injure the mother by the violent, and injurious attempts which are often made to relieve the animal.

As soon as the mare has foaled, she should be turned into some well sheltered pasture, with a hovel or shed to run into when she pleases: and as supposing she has foaled in April, the grass is scanty, she should have a couple of feeds of corn daily. The breeder may depend upon it, that nothing is gained by starving the mother and stinting the foal at this time. It is the most important time in the life of the horse; and if, from false economy, his growth be arrested now, his puny form and want of endurance will ever afterwards testify the error that has been committed. The corn should be given in a trough on the ground, that the foal may partake of it with the mother. When the new grass is flush and plenty, the corn may be gradually discontinued.

Our work is intended, principally, for farmers: they well know that the mare may be put to moderate work again a month after the foaling. The foal is at first shut in the stable during the hours of work; but as soon as it acquires sufficient strength to toddle after the mare, and especially when she is at slow work, it will be better for the foal and the dam that they should be together. The work will contribute to the health of the mother; the foal will more frequently draw the milk, and thrive better; and will be hardy and tractable, and gradually familiarized with the objects among which it is afterwards to live. While the mother, however, is thus worked, she and the foal should be well fed; and two feeds of corn, at least, should be added to the green food which they get when turned out after their work, and at night. The mare will usually be found at heat at or before the expiration of a month from the time of foaling, when, if she be kept principally for breeding purposes, she may be put again to the horse.

In five or six months, according to the growth of the foal, it may be weaned. It should then be housed for three weeks or a month, or turned into some distant rick-yard. There can be no better place for the foal than the latter, as affording, and that without trouble, both food and shelter. The mother should be put to harder work, and have drier meat. One or two urine balls, or a physic ball, will be useful if the milk should be troublesome, or she should pine after her foal.

There is no principle of greater importance than the liberal feeding of the foal during the whole of his growth, and at this time in particular. Bruised oats and bran should form a considerable part of his daily provender. The farmer may be assured that money is well laid out which is expended on the liberal nourishment of the growing colt: while, however, he is well fed, he should not be rendered delicate by excess of care. A racing colt is sometimes stabled; but one that is destined to be a hunter, a hackney, or an agricultural horse, should merely have a square rick, under the leeward side of which he may shelter himself, or a hovel, into which he may run at night, or out of the rain. The process of breaking-in should commence from the very period of weaning. The foal should be daily handled, partially dressed, accustomed to the halter, led about, and even tied up. The tractability, and good temper, and value of the horse, depend a great deal more upon this than breeders are aware: this should be done as much as possible by the man by whom they are fed, and whose management of them should be always kind and gentle. There is no fault for which a breeder should so invariably discharge his servant as cruelty, or even harshness, towards the rising stock; for the principle on which their after usefulness is founded, is early attachment to, and confidence in man, and obedience, implicit obedience, resulting principally from these.

From the National Intelligencer.

SUBMARINE ARCHITECTURE—ALEXANDRIA AQUEDUCT.

We have never had an opportunity of inspecting a more remarkable triumph of art than the operation of building massy stone piers in the bed of the River Potomac, now going on near Georgetown, at the expense of the Alexandria Canal Company, under the direction of Capt. Turnbull, of the U. S. Topographical Engineers. We yesterday paid a visit to the work, and found it to surpass our previous conception of it, as well in regard to the magnitude of the enterprise, as to the ingenuity with which very formidable obstacles have been overcome. These piers, the reader must understand, are to support an aqueduct, or canal, being a branch of the Chesapeake and Ohio Canal, which is to cross the river in this manner on its way to Alexandria. It is truly a stupendous undertaking, with no parallel in this country, and, we believe, scarcely equalled in any other. The pier which is begun is the second from the Alexandria (or Virginia) shore; the first being the next to be built. The foundation of this pier is on the bare rock, and the structure is of solid masonry, formed of very large blocks of excellent stone from the falls' quarries, skillfully laid in water cement. To accomplish the object, a vast coffer dam has been constructed, the interior of which is about eighty feet long and nearly thirty wide. The depth of water to be shut out by this dam is 18 feet, and the depth of mud below that depth of water, which mud it was necessary also to remove, was more than 17 feet; so that the building was begun at a depth of thirty seven feet below the surface of the water. Notwithstanding which, so successful had been the preparations for resisting the vast external pressure of water, that the rocky bottom was laid bare the whole extent of the area, enclosed and even swept clean and dry with brooms, before the cement was applied, in which, a few days ago, the first course of stone was laid. The length of the pier now building is, at the base, sixty-six feet, running in its length with the current and the tide; its precise breadth we do not remember, but it must be something over 15 feet. The mason work of the pier is going on rapidly and successfully. It had yesterday reached above 10 feet in height from the bottom. The whole number of these piers (some of them even larger than this) is to be eight, besides the end piers or abutments, and upon these the canal is to be carried, at an elevation of thirty feet above the level of the river.

We have given this sketch of a very remarkable work, in our immediate vicinity, first, because it is remarkable; secondly, to express our admiration of the spirit of the town of Alexandria in persevering in this undertaking of her's in defiance of all obstacles; and thirdly, that we may give the credit due to the accomplished engineer, who had labored so untiringly in carrying on this operation, and has now the gratification of rejoicing in its success. He is ably assisted in this duty at present by Lieut Ewing of the artillery, now on Topographical duty.

[The following letters, though treating on several different subjects, are all in some degree connected with each other, and with two others which have been already published—one "On the cultivation of corn mixed with other crops," at page 634 of Vol. II, and the other in last No. page 62, "On making rice on dry lands," These and the previous statements of the *profitable* application of so much labor and care for the purpose of making manure and improving the soil, are the more deserving of attention, because proceeding from the rich and new lands of Alabama, where (as in all similar situations,) it is generally held to be useless to expend any labor, either to increase or preserve fertility—or for any other purpose indeed, except to make as heavy a crop as possible in the current year, without regard to future consequences.]

For the Farmers' Register.

RICE BREAD—ON CORN MIXED WITH OTHER CROPS, CONTINUED.

Discovering from your letter of the 15th February, that cultivating rice on dry land was new to you, I have thought that one of the ways in which we use it, may be so equally. This mode of preparing it, grows with us out of the circumstance of raising it ourselves, with much ease, and having it in plenty. This grain is made to add to our bread stuffs, and is found a most superior addition. It is sent to the mill in its rough state, ground as wheat, and bolted, or returned to be passed, as corn meal, through the fine sieve. The flour is put through the usual process of making wheat bread, and made into loaves, in the form of what is termed "*family bread.*" When baked, it is as light and spongy as a fine muffin—and when accompanied by good butter, cannot be surpassed, in my opinion, by any preparation of the bread kind. Like the corn, it requires to be used in a warm state. When cold, it becomes unfit for use totally. But here again, domestic economy has contrived a valuable appropriation of what becomes cold, or is left after meals. Thrown into a pot with clean water the next day, it dissolves as soon as the water arrives at the boiling point, and if a fat fowl is added, makes, with the usual additional items, a superb soup. The absolutely necessary point in the fabrication of this bread is to have it light. This the Indians effect, who make it well, by making up the bread, or dough, entirely with hot water, in which the grits, as they call it, have been steeped, and which appears to act as an yeast in producing lightness. I have frequently used the hop yeast with equal success, although I prefer the Indian mode. As a breakfast preparation, this bread with good butter, if the first is well made, may fairly be termed a luxury. The first time I saw it its excellence surprised me, exhibiting a preparation to me entirely new, and unthought of—at the same time prepared with so much ease. The loaf may be made large. That a change of bread, as well as other articles of diet, is essential in preserving a healty action and tone of the digestive organs, I believe is well determined; consequently, rice bread, which must evidently be one of the most salutary, may fairly be enlisted in the number.

A sheaf of this grain submitted to the cutting box, and sprinkled with a small quantity of rye or Indian corn meal, is thought by our best horse masters to have a happy effect on the stomach of that useful animal—given at least weekly.

If my mode of cultivating land is the productive one,* it will be discovered readily that the manner in which I save my corn crop is what secures it, as but for the adoption of that plan, it would be out of the question. If to produce the greatest result possible, from any given quantity of land, and labor bestowed on it, is the course that a judicious cultivation of land would demand, and that it is, I believe may be termed a self-evident proposition, then the mode of cultivating land which I suggest, must be the correct one. Is it not making the "two stalks stand where but one stood before?" But still it must be observed, that the manuring plan comes in for a full share. Then the wisdom of that plan is equally self-evident, as but for it also, the result could not be obtained. But give the manure, and cut down and remove the corn when at maturity, and the result is certain.

The remarks of that distinguished cultivator Judge Buel, on this subject, in his excellent paper on the cultivation of the corn crop, must be familiar to reading agriculturists. There, it will be recollected, the Judge contends against any loss in the corn by this mode of saving the crop. So do I—and so will all who will fairly and judiciously try it. But if there should be a little shrinkage in the corn, there is none in the potatoes—the rice—the peas, and the pindars, [ground peas.] I ween two hundred bushels per acre of those valuable productions, will amply settle the shrinkage account, as also fairly and fully close that opened for "trouble." Nor will it be deemed, I hope, a small item in the adjustment of "profit and loss," that my land is well shaded by valuable ameliorating crops, during that part of the season when the burning rays of the sun acts so powerfully on land. The success of corn after rice, on upland, with us, it proverbial—especially if the stubble is turned well under. The effect of the potato, the pea, and the pindar on land, is well known, as improvers of soil. To those who are disposed to enter into the calculation, and adjust the account fairly, I will remark, that the manuring I give, preparatory to this "heavy crop," is an insurance for three more, or rather *five more in three years*—my rotation being corn, &c. cotton, rye, and peas on the stubble ploughed in, oats and peas on its stubble, followed by grass one year—no pasturing. The grass year is intended as a year of perfect rest to the land.

*See account of the cultivation at p. 634, vol. II.—Ed.

But to form a correct estimate of the value of my plan of saving the corn crop in addition to what has been already stated, I must beg leave to refer you to an accompanying paper on saving corn-stalks and converting them into a superior food, where it will be seen that I derive from my corn crop, a most valuable resource for raising cattle, and that the plan I have adopted for saving my corn gives me all the "refuse" of the corn in that state in which it yields the greatest possible quantity of nutriment, consistent with making the grain —and that this refuse part amounts to a prodigious mass to the acre—as also the pea crop in the manner in which I cure and preserve the vines—as also the vines of the potato crop, and pindars.

You will readily conceive that my corn field after the whole production is housed, enables me to support amply, a large stock. A principal feature in my theory is, to maintain and keep every hoof that I can support well, and of course to turn to the account of forage, every thing that can be made to go it. With me the key stone to the arch is, *manure*—but the year after I manure, I never fail to lime—the last slaked. I am aware the question will be asked, what do I litter with? To this I will say, leaves and weeds—and I litter well. My cattle lie dry and warm in winter—in summer dry and cool, on beds of leaves and weeds, and my fence rows are kept clean. Every thing that can be eaten by my stock is eaten, because it is prepared for that purpose: and my stock in return, gives that which prepares the leaves and weeds for giving to the soil additional productive powers, and secures the heavy crop, and ample remuneration for the labor bestowed.

AGRICOLA.

Alabama, March 25, 1835.

For the Farmers' Register.

ON SAVING CORN-STALKS, AND PREPARING THEM AS FOOD FOR CATTLE.

In my paper of the 25th March I referred to another on the subject of the plan of saving a corn crop adopted by me, in such a manner as to reap from every part of the refuse a great benefit in the way of feeding my cattle. The appropriation of the stalk particularly, in this way, so as to make it yield the greatest benefit that could be obtained from it, consistent with producing and saving the crop of grain, early arrested my attention, from reading a variety of communications for years back on the subject of the nutritive qualities contained in the stalk at particular periods—as also some experiments made in feeding with them. In the prosecution of this object, I was urged by succeeding in saving a corn crop in the manner pointed out by that valuable agriculturalist Judge Buel, and which plan I had seen practised on the South Branch of Potomac, before reading it. I make this communication to you, sir, the more especially, as I have read in your highly valuable periodical, the "Register," some communications on managing the corn-stalk to advantage, and believing that I am considerably ahead in an economical use of it. Since the plan has been adopted by me, and its valuable effects exhibited, you will be assured I read with some pain the many labored communications so frequently given to the public, of judicious methods of turning the corn-stalk into manure, &c. The prodigious mass of valuable food produced from a field is another consideration that I am compelled to regard with much interest. All will readily acknowledge that at one stage the corn-stalk as a food for animals, exhibits highly nutritious qualities. Now to arrest, or save as much of those in it as possible, is one of the great arguments with me, in favor of my mode of saving the corn crop; but I am assured this is equally effected as regards the fodder and shuck.

After housing my corn crop, as before stated, [p. 635, Vol. II.] the first rainy day, if no more pressing wet work is calling for attention, all hands "go to shucking corn, and stripping off blades." If I am in want of this last species of forage for my plough horses, or mules, which by the by is not often the case, as my gama grass hay and oats cut in the sheaf with which the cutting trough is kept constantly replenished, supplies that want. In shucking the individual throws the corn in one direction, and lays the stalk with attention to regularity beside him, until he has an armfull, when he takes them up carefully, and deposites them a short distance from him, in regular order for putting into the cutting box, where they are reduced, frequently stalk, shuck, and blade, to pieces of about an inch in length.

At a convenient distance from this apartment, three strong made hogsheads are placed, well pitched on the outside, made expressly for the purpose, with tops well fitted of light wood or straw, and standing on a platform about three feet from the ground, having at the bottom a large spigot to let off their contents. Just before them a large trough is placed, and which, with the steaming apparatus standing between the two last, is inclosed and covered with a shed. Into these hogsheads I throw a small quantity of boiling water, and into the water a small quantity of corn or rye meal, just sufficient, when the cask is filled up with cool soft water, to produce the vinous fermentation, as if going to distil. As soon as the liquid has attained that state, I steam off a turn of the cut stalks, shucks, &c., putting the last into the trough, over which, by means of a portable trough, such as distillers use, I permit the fermented liquid to flow and cover the cut stuff, which has been well pressed down previously in the trough, and held down by a moveable top. This done in the evening, the forage becomes perfectly saturated by morning with the liquid, at once one of the most nutritious and palatable preparations for the cow kind yet discovered. The cut stuff charged with the wash, is deposited in the feeding troughs, taken out of the trough in which they are saturated, in baskets, which carries away no more of the liquid than what is contained in it by absorption. Every particle is consumed by the cattle, care being taken to serve them with the food as they consume it. By a little arrangement I keep my hogsheads so filled, that one is always ready for use. My horses and mules consume this preparation with equal *gout* as the cattle. As a food for my work oxen when laboring, it is, experience convinces me, superior. It "sticks by the ribs"—and plentifully given keeps them in fine plight. The apparent pleasure with which the animals consume this preparation is observable. I know of no food which they eat with more avidity—and what I consider of much advantage to them, especially the cow kind, they soon fill themselves. Satisfied that nature intended that the food of animals should include a variety, and that this being a law of nature, this variety is necessary for the highest state of animal health, I have added to the stalks every vegetable substance that can be subjected to the cutting box, usually given as food, viz: straw of oats, rye, rice, wheat and hay, pea vines, and sweet potato vines cured—and if plenty, any vegetable roots that can be spared from other animals—and in the season, a portion of grass. I am fully satisfied that the gain in keeping my cattle, which I obtain from cutting up their food, is much more than an equivalent for the time and labor bestowed—and that a still greater equivalent is received from the steaming; for it must be remembered, I convert into food a mass of what could not otherwise be made so.

My first essay was with the stalk alone, stripped of blades and shuck. The result was about the same as when the blades and shuck were permitted to go to the trough. The effect produced by this preparation, on milch cows, I have found all that could be desired—and in addition to the foregoing, with plenty of salt, it will be found to produce in the animals a high degree of health.

Now, sir, in answer to some of your excellent correspondents, I will observe that I am compelled to view my plan as the best to convert the corn-stalk into manure: and I view my gain on this score, equally great. My cattle are well littered with pine straw, or oak leaves, &c. The production of my corn-stalks passing through the stomach of animals, affords me the rich means of converting them into the best of manure, to a prodigious amount. Here my gain over the ploughing-in system is, I think, decided and self-evident. Plough in a ton of stalks, and let me carry out of my dungstead what another ton has enabled me to produce, and the result will readily be anticipated.

AGRICOLA.

Alabama, March 30, 1835.

For the Farmers' Register.

THE PEA AND POTATO HARVEST, ON THE PLAN OF MIXED CROPS.

My last paper finished the saving of my corn stalks, and their conversion into food for cattle, in a way that I have found highly profitable. The pea and potato vines remain to be disposed of. As early as the pea will admit of curing by pulling up, and exposing to the sun and wind, I proceed selecting weather that offers some apparent security for a few days of clear sky. I pull them up, shaking as much earth from the roots as conveniently can be detached, raise the vines partly from the ground, and turn them partially over, so that they may stand up from the earth as much as possible. In all the different peas I cultivate, I find that my plan in saving this part of the crop, enables me to secure every leaf almost green. I do not fear a little shrinkage in the pea, more than the corn, as the ultimate gain meets that charge. After two days sun, and as many turnings over, and raising from the ground, they are carried home, and in a pen built of common rails, (a few armfulls of dry straw laid in the bottom, which is a tight floor,) I throw the pea vines, which are pressed down by the weight of children, into a layer of about twelve inches thick—over this layer I scatter a few handfuls of fine salt, not being careful about giving too much, as there will be none lost ultimately; whatever goes to the bottom will be arrested by the floor, and answer the next season for cattle. A few handfuls of dry straw are again added, sufficient to separate the layers of pea vines; then pea vines, salt and straw, until my pen is full. On commencing to fill my pen, I place a keg in the centre, which is drawn up as I progress, so that when the pen is filled, a hole is formed in the centre, admitting the escape of gas, and the entrance of atmospheric air. Over the whole I now place a tight roof of clap-boards, securing their remaining as placed in the usual manner. I will leave to your readers to *guess*, as they would have to do were they in Connecticut, at the reason, but the straw used in this process of saving pea vines, is eaten with singular avidity by all kinds of stock, as it is taken from amongst the peas. For sheep, this kind of winter provision cannot be excelled—given to milch cows, its valuable effects is soon discovered on the flesh, milk, and butter. It is also excellent for producing a fat kid. Any peas dropped by the cattle or sheep, are well accounted for by the pigs—nothing is lost. The pindar vines are disposed of in the same way—and the vines of my sweet potato crop, of which I make the richest of forage for cattle.

About the time of digging my potato crop, with a proper reference to the weather, by the aid of the common sickle, or a knife constructed for this purpose, I cut the vine from the hill or ridge, drawing them partially together, for the purpose of raising them as much as possible from the ground to admit the action of the sun's rays, and the operation of drying winds. On the succeeding day, I turn them partially over, and repeat the same on the third; hauling them home on the fourth, to dispose of them in the manner before stated, respecting preserving the pea vines. In the article of salt to the potato vines, a little more liberality is bestowed, and they are pressed down in the pen only by their own weight, observing to lay them as regular in the layers as possible. This offal, when cut and steamed for milch cows, is certainly superior.

The frequent difficulty of saving those two crops of offal, by a sudden change of wet weather, must be acknowledged: I have found, however, that the cure is redoubled activity—if a heavy shower only takes place, neither the one nor the other is gone—raised up and turned over a little more frequently, and the effect of one wetting is soon got clear of. If the misfortune of a wet season happens, I haul home, bring up every thing that will eat vines, and feed away under sheds, in my stables and dungstead—keeping up my stock, principally, until all is consumed: consequently, I save in the manure account.

My potatoes I dig and haul home, saving in the usual way. In my former statements respecting this part of the crop, I find myself guilty of an omission that would induce a reader to ask where I got a sufficiency of seed to plant a large field? I lay off the part of the field to be planted in potatoes, find how much seed I have, and how far it will go—plant every third, fourth, fifth or sixth row of corn hills, as the case may make necessary. As the potatoes throw out vines, I cut them, and plant the slips so obtained until my field is filled out. The balance of the potato crop, after digging and gathering that remains in the ground, serves effectually to keep with the help of the pindars, a handsome twist in the tails of my growing stock hogs during the winter, putting them in during part of the day, and penning at night, on account of obtaining from them a portion of Arator's "gold dust."

Having now gone through the making and saving, as also the manner in which I dispose of my corn crop, with its accompaniments, you will, with your readers, be fully enabled to judge whether my system is a productive system of husbandry, or whether I have succeeded in making the "two stalks stand where one stood before"—or whether it is, or is not better to cultivate a small field well, or a large body of land in the "old way"—wear, tear, seed, labor, production, &c., considered. Or whether or not, a manuring system is the key to all very successful agricultural pursuit—or whether a man will sleep sounder after the recollection that his capital, his land, is deteriorating, or increasing in fertility. These and several other items can be readily, I think, settled, from the foregoing, as they have been by

AGRICOLA.

Alabama, April 10, 1835.

CHICKASAW PEA—PEA FODDER.

To the Editor of the Farmers' Register.

Columbia, S. C., May 11, 1835.

I send you here enclosed a few of the peas mentioned in your last number, [page 752, Vol. II.] as a dark bottle green pea, the smallest of the tribe. I prefer it to all others for fodder. Not being a running vine, but rather a bush, it is much more manageable than the common cow pea. My horses prefer it to all other fodder, and when they have it, never leave a bit, eating it all to the oldest and dryest stalk. The best practice in curing pea vines here, is not to let them remain as long in the sun as your correspondent J. M. G. intimates is necessary; but they are cut one day and housed the next, taking care not to let them be packed too close, but kept open by poles or rails being put here and there between them, and kept so for three or four weeks, when the poles or rails are withdrawn, and the fodder may be then packed as close as convenient. Or a pen is made with rails, is filled up with a few sticks between, and the whole covered with a few boards. The pea herein sent, is called Chickasaw pea; by whom and why it was so called, I do not know; but I sent many years ago one or two gallons of them to the Editor of the American Farmer in Baltimore, and having forgotten this circumstance, he sent me a few in a letter by the name of Chickasaw pea. I do not think it a native of this country, but have reason to believe it came from the East Indies. This is the plant that would make a most excellent and convenient green dressing for land, were it not as good as it is for fodder. The best way of planting it is in beds two or three feet apart, and ten to fifteen inches in the beds. I usually set one or two gatherings of the pods for seed, and cut them one day, and the next tie them in small bundles and house them as above.

My Florida coffee is coming up very well, and I am pretty well satisfied by its appearance, that it is a "*cassia*"—but what species remains to be seen.

N. HERBEMONT.

From the Silk Culturist.

PROFITS OF SILK CULTURE IN CONNECTICUT.

The following facts have been communicated to the Executive Committee [of the Silk Society] by Mr. Harvey Clark, a respectable inhabitant of Mansfield, in this State.

Mr. Clark is the proprietor of two acres of land in Mansfield, of which about half an acre is covered with mulberry trees. He has made annually from these trees about 35 lbs. of raw silk, which for the last year or two has been reeled in the improved method. The leaves have usually been gathered and the worms fed for the first three weeks by Mrs. Clark and a young woman who lives in the family. After the first three weeks, Mr. Clark also devotes himself entirely to the business. The silk has been reeled exclusively by Mrs. Clark and the young woman above alluded to, at the rate of about one pound and a half a day. During the whole silk season they have also had the care of a family of eight small children. Mr. Clark has sold his raw silk this year at four dollars per lb. and has also received a premium of 50 cents per lb. from the State Treasury. We have reason to believe that the same silk might have been sold at Lyons, or to silk merchants at New York, for five dollars per lb. Mr. Clark's mulberry trees are forty or fifty years old, and of a large size. They have been manured and cultivated with great care for the last fifteen years. Mr. Clark thinks that an acre of land covered with trees equal to those on his land will yield about 70 lbs. of silk a year. His silk house, or cocoonery, is fifty feet long and sixteen feet wide, and one story or about eight or ten feet high, not lathed or plastered, and may have cost $150 or $200. He has never had occasion to warm his cocoonery, as is practiced in Italy and France; indeed, this has never been done by any of the silk growers at Mansfield. Mr. Clark informs us, that at the silk factory in Mansfield reels are now propelled by water power. A very small amount of power answers the purpose. Improved reels are now made by several mechanics who live either at Mansfield or in the vicinity. Mr. Clark states, that his mulberry trees have been greatly improved by careful cultivation. We have shown Mr. Clark a statement in the last number of the Cultivator, of the profits made by Mr. Carrier of France, from an acre of mulberry trees.* He thinks that the statement is probably not exaggerated, and that an acre of well cultivated mulberry trees at Mansfield would yield a larger amount of silk.

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* This article was translated for, and first published in the Farmers' Register, Vol. II.

From the Silk Culturist.

SUPERIOR QUALITY OF AMERICAN SILK.

From repeated experiments, Monsieur D'Homergue, is decidedly of opinion that American silk is vastly superior to European. The weight of the cocoons are nearly fifty per cent. heavier, and possess a uniformity which is not to be found in Europe. He found that eight cocoons, with their chrysalis, not selected, produced two ounces of raw silk, whereas one pound of ordinary European cocoons would be required for the same quantity. He also selected seventy-five cocoons, without chrysalis, weighing together 450 grains, which yielded 419 grains of raw silk, superior to that of France or Italy. Twelve bad cocoons also produced fifty grains of beautiful silk.

"These results," he says, "are truly surprising, as they show a superiority in the silk produced by the American worm, (at least in Pennsylvania,) over that of any other country that he has seen, which he was far from expecting when he began his experiments, and which, he believes, no one had yet suspected or imagined." He also adds "they promise an immense source of riches to the United States."

We might recite the authority of other culturists and manufacturers, but they all concur in the opinion that American silk is altogether superior to that produced in any other country.

Extract from the Massachusetts Agricultural Repository, &c. 1818.

LIST OF THE FOREST TREES OF AMERICA, DESCRIBED IN THE WORK OF M. ANDRE F. MICHAUX.

[The botanical name of each tree will be given in the larger Roman letters, followed by the most common American name in Italic, in the same line. The vulgar names used in various parts of the United States, or Canada, next follow in smaller letters.]

Pinus rubra—*Red pine.*

Red pine, only name given to this tree in Canada; often used in Nova Scotia and New Brunswick, and in Maine. *Norway pine*, name more generally in use for this tree than the above, in the district of Maine, New Hampshire, and Vermont, but less proper. It is not the Norway pine, says Michaux. *Yellow pine*, name sometimes given to it in Nova Scotia. *Pin rouge*, or red pine in Canada. Michaux prefers red pine, as being more characteristic and distinct.

Pinus rupestris—*Gray pine.*

Gray pine, in Canada, by the French and English. *Scrub pine*, in Nova Scotia and Maine. Uncommon and ordinary. Michaux.

Pinus mitis—*Yellow pine.*

Yellow pine, general name in all the middle states. *Short-leaved pine*, in the southern states. *Spruce pine*, a secondary name in these last mentioned states.

This is described by Michaux as a pretty valuable tree, ranking after the red pine, which is again put far behind the long-leaved or pitch pine of the south, and the white pine of the north.

Pinus inops—*Jersey pine.*

Jersey pine, general name in New Jersey, where it abounds. *Scrub pine*, the name given to it in Virginia, and in those parts of Pennsylvania where it is found,

Pinus pungens—*Table-mountain pine.*

Table-mountain pine, the only name given to it in the neighborhood of that mountain, in North Carolina.

Pinus australis—*Long-leaved pine.*

Yellow pine. Long-leaved pine. Pitch pine, (not the pitch pine of the north.) *Broom pine*, all which names are more or less used in the lower parts of the southern states, where alone this tree grows. *Southern pine* and *red pine*, are the names given to it in the middle and northern states, by those who use it. *Georgia pitch pine*, name given to it in the West Indies, and in England.

Pinus serotina—*Pond pine.*

Pond pine, name given by M. Michaux to this pine, which has none given to it in the southern states, where he found it.

Pinus rigida—*Pitch pine.*

Pitch pine, general name in all the northern and middle states. This is the true pitch pine of New England, but very different from the pitch pine of the south.

Pinus tœda—*Loblolly pine.*

Loblolly pine, only name in the southern states. *White pine*, sometimes so called in the neighborhood of Petersburg, Virginia.

Pinus strobus—*White pine.*

White pine, only name given to this tree in the greater part of the United States, and in Nova Scotia and New Brunswick. *Pumpkin pine* and *sapling pine*, names sometimes given to it in Vermont, New Hampshire, and Maine, in reference to the quality of its wood. *Pin blanc*, or *white pine*, by the Canadians. *Weymouth pine*, in England.

Abies nigra—*Black spruce, (double spruce.)*

Black, or *double spruce*, name used in the northern states, in Maine, and Nova Scotia. *Red spruce*, in the same countries, having regard, however, to trees of larger size than usual, or to certain places of growth. *Epinette noire*, in Canada. *Sapinette noire*, in France.

Abies alba—*White spruce.*

White, or *single spruce*, names applied in the northern states, and in Nova Scotia. *Epinette blanche*, in Canada. *Sapinette blanche*, in France.

Abies Canadensis—*Hemlock spruce.*

Hemlock, or *hemlock spruce*, only denomination in use in all parts of the United States, where this tree is found. *Pèrusse*, by the Canadians.

Abies balsamifera—*Silver fir.*

Silver fir. Fir balsam. Balm of Gilead, all names equally applied to this tree in the northern parts of the United States.

Juglans nigra—*Black walnut.*

Black walnut, only name in the southern and western states. *Noyer noir*, by the French of Canada and Louisiana.

Juglans cathartica—*Butter nut.*

Butter nut, only name in New York, and Virginia, and often applied in the northern states. *White walnut*, name much in use in Pennsylvania and Maryland. *Oil nut*, name applied in New Hampshire, Massachusetts, Vermont, and Connecticut.

Juglans olivæ-formis—*Pacane nut.*

Pacane nut, or *pacanier*, name given to this tree by the French of Louisiana, and adopted by the Americans.

Juglans amara—*Bitter nut hickory.*

Bitter nut hickory, only name applied to it in New York and New Jersey. *White hickory*, general name in Pennsylvania. *Noyer amer*, Canadian name.

Juglans aquatica—*Water bitter nut hickory*

Water bitter nut, name given to it by Michaux. It has no name in the southern states, where it grows.

Juglans tomentosa—*Mockernut hickory.*

Mockernut hickory, general name in New York and New Jersey. *Whiteheart hickory*, name sometimes applied in those states. *Common hickory*, applied in Pennsylvania, Maryland, and other southern states. *Noyer dur*, by the French of the Illinois country.

Juglans squamosa—*Shellbark hickory.*

Shellbark hickory, name in most common use in the United States. *Shagbark hickory*, name sometimes applied to the north of Connecticut river. *Kisky Thomas*, by the Dutch of New Jersey. *Noyer tendre*, by the French of Illinois.

We think M. Michaux mistaken on this point. It is the common walnut of our tables, and is almost universally called *shagbark*. In all the northern states, we know this tree by the name of walnut, and not hickory, which is a southern name.

Juglans Laciniosa—*Thick-shell-bark hickory.*

Thick-shell-bark hickory, name given to this tree in the western states, where it is confounded with the true shell, or shagbark. *Gloucesternut hickory*, known under this name only in that part of Virginia. *Springfield hickory*, another name given to this tree in the vicinity of Philadelphia.

Juglans porcina—*Pignut hickory.*

Pignut hickory, most common name in all parts of the United States. *Hognut hickory*, more usual name in some districts of Pennsylvania.

Juglans myristicæformis—*Nutmeg hickory-nut.*

Nutmeg hickory-nut, name given to it by M. Michaux, it having no name in the southern states.

Quercus alba—*White oak.*

White oak, general and unique name throughout the United States. *Chêneblanc*, by the Canadians.

Quercus muscosa—*Mossy cup oak.*

Mossy cup oak, name given by M. Michaux to a species found in the Genessee country, and near Albany.

Quercus macrocarpa—*Overcup white oak.*

Overcup white oak, general name given to it in Kentucky and Tennessee.

Quercus obtusiloba—*Post oak.*

Post oak, general name in both Carolinas, Georgia, and Tennessee. *Iron oak*, secondary name in those countries. *Box oak* and *box white oak*, name given to it in Maryland, and the parts of Virginia bordering on it.

Quercus lyrata—*Overcup oak.*

Overcup oak and *swamp-post oak*, names equally used in the lower parts of the southern states. *Water-white oak*, secondary name in the same places.

Quercus prinus discolor—*Swamp white oak.*

Swamp white oak, most common name in the northern and middle states. *Water-chestnut oak*, Pennsylvania name.

Quercus prinus palustris—*Chestnut white oak.*

Chestnut white oak, name applied in the lower parts of Georgia, and the Carolinas. *White oak*, peculiarly so called on the Savannah river. *Swamp-chestnut oak*, secondary name in the same places.

Quercus prinus monticola—*Rock-chestnut oak.*

Rock-chestnut oak, only name given to this tree in New York and Vermont. *Rock* and *rocky oak*, second name in the same countries. *Chestnut oak*, in Pennsylvania and Virginia.

Quercus prinus acuminata—*Yellow oak.*

Yellow oak, name given to this tree in the county of Lancaster, Pennsylvania. No particular name given to it in other parts of the United States.

Quercus prinus chinquapin—*Chinquapin oak.*

Chinquapin oak, name employed in the upper parts of Georgia, and the Carolinas. *Small-chestnut oak*, in New York and Pennsylvania.

Quercus Virens—*Live oak.*

Live oak, only name in all the southern states; and also in the northern states, where the wood is only seen, but the tree is never found.

Quercus Phellos—*Willow oak.*

Willow oak, only name in the southern states, and in Pennsylvania.

Quercus imbricaria—*Laurel oak.*

Laurel oak, secondary name in the states west of the Alleghany mountains. *Black-jack oak*, more common, but less proper name, because it is applied to another, for which it is kept distinct. *Chêne à latte*, by the Illinois French.

Quercus cinerea—*Upland willow oak.*

Barren's willow oak, name given in the lower parts of the southern states.

Quercus pumila—*Running oak.*

Running oak, in the lower parts of the southern states.

Quercus heterophylla—*Bartram's oak.*

Bartram's oak, name given to an oak on Schuylkill, near Philadelphia.

Quercus aquatica—*Water oak.*

Water oak, general name in Virginia, and in the southern states.

Quercus ferruginea—*Black-jack oak.*

Black-jack oak, name in use in the southern states. *Barren's oak*, name employed in Pennsylvania, New Jersey, and Delaware.

Quercus banisteri—*Bear oak.*

Bear oak, name in New Jersey and New York. *Black scrub oak*, name used in the north of Connecticut river. *Scrub oak*, in some parts of Pennsylvania and Virginia.

Quercus catisbæi—*Barren's scrub oak.*

Barren's scrub oak, in the lower parts of the two Carolinas and Georgia.

Quercus falcata—*Spanish oak.*

Spanish oak, only name in use in Pennsylvania, Maryland, and Virginia. *Red oak*, in the lower parts of the southern states.

Quercus tinctoria—*Black oak.*

Black oak, only name in the forests of the middle, western, and southern states. *Quercitron oak*, name in commerce. *Chêne noir*, by the Illinois French.

Quercus coccinea—*Scarlet oak.*

Scarlet oak, name given by M. Michaux to a tree, which, in the middle states, bears the name of *red oak*, being confounded with a species hereafter mentioned.

Quercus ambigua—*Gray oak.*

Gray oak, only name given to this species in New Hampshire and Vermont, as well as in the district of Maine, New Brunswick, and Nova Scotia.

Quercus palustris—*Pine oak.*

Pine oak, name given to this species in New York and New Jersey. *Swamp Spanish oak*, in Pennsylvania and Maryland.

Quercus rubra—*Red oak.*

Red oak, name given to this oak in all the northern and middle states.

In all 27 species of oaks.

Betula papyracea—*Canoe birch.*

Canoe and *paper birch*, names equally used in New Hampshire, Vermont, district of Maine, Nova Scotia, and further north. *White birch*, name also equally applied in the same countries. *Bouleau à canot*, by the French in Canada.

Betula populifolia—*White birch.*

White birch, general name in the northern and middle states. *Old-field birch.*

Betula rubra—*Red birch.*

Red birch, so called in New Jersey and some parts of Pennsylvania. *Broom birch*, secondary name in Pennsylvania. *Birch*, in the southern states.

Betula lenta—*Black birch.*

Black birch, denomination applied to it in the northern and middle states, *Cherry birch*, secondary name in some parts of the northern states *Sweet birch*, in the middle states. *Mountain mahogany*, in a part of Virginia. *Cherry birch*. *Bouleau cerisier*, by the Canadians.

Betula lutea—*Yellow birch.*

Yellow birch, name given to this species in Vermont and New Hampshire, as well as in Maine and New Brunswick.

Castanea vesca—*Chestnut.*

Chestnut, only name given to it in all parts of the United States where it grows.

Castanea pumila—*Chincapin.*

Chincapin, only denomination given to it in the middle, southern, and western states.

Fagus Sylvestris—*White beech.*

Beech, in the middle and southern states. *White beech*, in the northern states and district of Maine.

Fagus Ferruginea—*Red beech.*

Red beech, in the northern states, and district of Maine.

Chamærops palmeto—*Cabbage tree.*

Cabbage tree, or *palmetto*, in the southern states. This tree is extensively used in the construction of wharves in Charleston, South Carolina, being free from the ravages of the worms.

Ilex opaca—*American holly.*

American holly, so called in all the parts of the United States where it grows.

Diospiros Virginiana—*Persimmon tree.*

Persimmon, only name in these parts of the United States where it is found, being in the middle and southern states. *Plaqueminier*, by the Louisianians.

Acer Eriocarpum—*White maple.*

White maple, only name on the borders of the Ohio, and the rivers which fall into it. *Soft maple*, in the Atlantic states, where it is often confounded with the *scarlet maple*. *Sir wager maple*, name applied to it in England, where it has been introduced.

Acer Rubrum—*Red-flowering maple.*

Red-flowering maple. Swamp maple. Soft maple, denominations in the Atlantic states. *Scarlet-flowering maple*, principally in Virginia; and *soft maple* in New York and New Jersey. *Maple tree*, in Pennsylvania, Virginia, and Ohio, to the west of the Aleghany Mountains *Erable plaine*, by the Canadians.

Acer saccharinum—*Sugar maple.*

Sugar maple, general name; which however prevails only in the middle states, to the east of the mountains. *Rock maple*, name which prevails to the north of the Hudson river. *Hard maple*, another name in the northern states. *Erable sucré*, Canadian name.

Acer nigrum—*Black sugar maple.*

Sugar tree, general name in the country on the Ohio, and the rivers which fall into it; and often applied also there, to the last mentioned species. *Black sugar tree*, name sometimes applied, and to be preferred.

Acer negundo—*Box elder.*

Box elder, only name in the western states, where the tree is most known. *Ash-leaved maple*, name given sometimes in the Atlantic states. *Erable à giguière*, by the Illinois French.

Acer Striatum—*Moose wood.*

Moose wood, common name in all the northern states, in New Brunswick and Nova Scotia. *Striped maple*, by some persons in the middle states.

Nyssa grandidentata—*Large tupelo.*

Large tupelo, most general name in the southern states. *Water tupelo*, secondary name in the same states.

Nyssa capitata—*Sour tupelo.*

Sour tupelo, in Georgia.

Nyssa Sylvatica—*Black gum.*

Black gum tree, in all the states to the south of the Delaware. *Sour gum*, secondary name in the same states. *Peperidge*, by the Dutch of New Jersey.

Gymnocladus dioica—*Coffee tree.*

Coffee tree, only name given in the western states. *Chicot*, by the Canadians. By some botanists called *guilandina dioica.*

Pinckneya pubens—*Georgia bark.*

Georgia bark tree, name given by M Michaux; it is known by no name in that country.

Cupressus disticha—*Cypress.*

Cypress, general name in the United States. It is not known at all in the northern states, except in modern plantations, and there called *deciduous cypress*. *Bald cypress*, name less used. *Black*, or *white cypress*, having regard to the color of the wood.

Cupressus thuyoides—*White cedar.*

White cedar, only name in the states of New York, New Jersey, Delaware, and Pennsylvania. *Juniper*, in Maryland, Virginia, and North Carolina.

Thuya occidentalis—*Arbor vitæ.*

Arbor vitæ, secondary name in the district of Maine. *White cedar*, name more used in Maine, Vermont, and New Hampshire. *Cedreblanc*, by the Canadians.

Larix Americana—*American larch.*

American larch, general name given to this tree in all parts of the United States where it grows. *Hackmatack*, more used in the north, and in the district of Maine. *Tamarach*, by the Dutch of New Jersey.

N. B. This tree is very seldom called by the name of larch in New England, and, in some districts, it is called *juniper.*

Juniperus Virginiana—*Red cedar.*

Red cedar, only name given to this tree in all parts of the United States where it grows.

Q. Is it not sometimes called *savin?*

Olea Americana—*Devil wood.*

Devil wood, name given to this tree on the Savannah river, in Georgia.

N. B. We doubt the expediency of establishing this unfashionable name to any tree.

Carpinus ostrya—*Iron wood.*

Iron wood, only name in all the states to the south of the Hudson. *Lever wood*, in the district of Maine and Vermont.

Carpinus Americana—*American hornbeam.*

American hornbeam, only name given to this tree throughout the United States.

We doubt whether it is ever called any thing but simply, *hornbeam.*

Hopea tinctoria—*Sweet leaves.*

Sweet leaves, only name in use in the southern states.

Malus coronaria—*Crab apple.*

Crab apple, name given to this tree in all the southern states.

Q. Is this a native or indigenous tree?

Mespilus arborea—*June berry.*

June berry, name given to this tree in the middle states. *Wild pear*, in the district of Maine.

Magnolia grandiflora—*Large magnolia.*

Large magnolia, most common name in the cities of the southern states. *Big laurel*, in the country of the southern states. *Laurier tulipier*, by the Louisianians.

Magnolia glauca—*Small magnolia.*

Small magnolia, name given to this tree by many persons in New York and Philadelphia, as well as in some parts of New Jersey. *Swamp sassafras*, secondary name at a given distance from the above cities. *Sweet bay, white bay*, and *swamp laurel*, names more used in the southern states. *Beaver wood*, name formerly given to it in New Jersey.

Magnolia acuminata—*Magnolia cucumber tree.*

Cucumber tree, only denomination in all the western states, and along the Alleghany Mountains.

Magnolia cordata—*Heart-leaved magnolia.*

The heart-leaved magnolia, name given to this species in Upper Georgia, and which is confounded with the preceding.

Magnolia tripetala—*The umbrella tree.*

The umbrella tree, only name given to this tree in the middle and southern states.

Magnolia auriculata—*The ear-leaved magnolia.*

The ear-leaved magnolia. Indian physick, denomination most in use in the mountains of North Carolina and Virginia, but less proper. *Long-leaved cucumber tree*, second name in the same countries.

Magnolia macrophylla—*Large-leaved magnolia.*

Large-leaved magnolia, name given by M. Michaux to this species, which is confounded with the next preceding one.

Fraxinus Americana—*White ash.*

White ash, only name given to this species, in all parts of the United States where it grows.

Fraxinus tomentosa—*Red ash.*

Red ash, most general name in all the middle states, where this tree is most abundant.

Fraxinus Viridis—*Green ash.*

Green ash, name given by Michaux to this tree, which has none where it is found.

Fraxinus quadrangulata—*Blue ash.*

Blue ash, only name in Kentucky and Tennessee.

Fraxinus sambucifolia—*Black ash.*

Black ash, most general name in the northern and middle states. *Water ash*, secondary name in this art of the United States.

Fraxinus platicarpa—*Carolinian ash.*

Carolinian ash, name given by M. Michaux. It has none in the southern states, where he found it.

Gordonia lasyanthus—*Loblolly bay.*

Loblolly bay, only name in the southern states.

Gordonia pubescens—*Franklinia.*

Franklinia, name given by W. Bartram, in honor of Dr. Franklin.

Cornus Florida—*Dogwood.*

Dogwood, only name given to this tree in the United States. *Bois de flèche bâtard*, by the French of Louisiana.

Rhododendron maximum—*Swamp laurel.*

Swamp laurel, so called on the Alleghany Mountains, where this tree is most abundant.

Kalmia latifolia—*Mountain laurel.*

Mountain laurel, most common name in the Alleghany Mountains. *Sheep laurel*, secondary name in the same places. *Calico tree*, in some parts of the southern states.

N. B. M. Michaux considers, that this plant is not found to the north of the Hudson River. It is abundant in some parts of Massachusetts, where it is generally only a shrub. He says, it grows in Carolina to the height of 15 or 20 feet, and, as its wood is very hard, it is applied to some useful purposes in the arts.

Cerasus Virginiana—*Wild cherry.*

Wild cherry, only name given to this tree throughout the United States.

Cerasus Caroliniana—*Wild orange.*

Wild orange, only name given to this tree in the southern states.

Cerasus borealis—*Red cherry.*

Red cherry, name less used than that of small (or dwarf) cherry, but which is more appropriate.

Annona triloba—*Papau tree.*

Papau, only name given to it in the middle and western states.

Gleditsia triacanthos—*Honey locust.*

Honey locust, known under this name only, in all parts of the United States where it grows.

N. B. M. Michaux is mistaken in this general assertion. It is also called *three-thorned acacia*, in the catalogues of the nurserymen.

Gleditsia monosperma—*Swamp locust.*

Swamp locust, in the maritime parts of the southern states. *Water locust*, secondary name in the same parts of the southern states.

Laurus sassafras—*Sassafras.*

Sassafras, only name given to this tree in the United States.

Laurus caroliniensis—*Red bay.*

Red bay, only name given to this tree in the maritime parts of the southern states.

Platanus occidentalis—*Button wood.*

Button wood, name generally given in the United States, particularly the Atlantic ones. *Plane* and *sycamore*, names more used in the western states. *Water beech*, name given to it in some parts of Maryland and Virginia. *Colonier*, by the French of Upper Louisiana.

Liquidambar styraciflua—*Sweet gum.*

Sweet gum, only name in the United States.

Lyriodendron tulipifera—*Poplar*, or *tulip tree.*

Poplar, general name in the United States. N. B. This is an evident mistake of M. Michaux. It is seldom called poplar, and it is an improper name to be affixed to it, as its popular one. *Tulip tree*, most common name in the northern states, where it is only known as a cultivated tree. *Yellow* or *white poplar. White wood*, name in the Genesee country.

Bignonia catalpa—*Catalpa tree.*

Catalpa tree, general name in the southern states.

Andromeda arborea—*Sorel tree.*

Sorel tree, name given to this tree on the Alleghany Mountains, and in the middle states.

Celtis occidentalis—*Nettle tree.*

Nettle tree, in all the United States. N. B. We doubt its having such, or any other name in the northern states.

Celtis crassifolia—*Hackberry tree.*

Hackberry tree, only name given to it in Kentucky and Tennessee. *Hoop ash*, upon the borders of the Ohio river, in Pennsylvania and Virginia. *Black elder*, less common name in the same places.

Morus rubra—*Red mulberry.*

Red mulberry, only name given to this tree in all the United States.

Pavia lutea—*Buck eye.*

Buck eye, only name given to it on the Alleghany Mountains, and in the western states.

M. Michaux ought to have added, that it is also called the *yellow-horse chestnut.*

Æculus Ohioensis—*Ohio buck eye.*

Ohio buck eye, name given by M. Michaux, who claims to have been the first who distinguished it.

N. B. The popular name of this tree ought also to be either American, or Ohio horse chestnut; for M. Michaux admits it is in truth a horse chestnut, and it would be very embarrassing to admit such confusion in popular names.

Robinia pseudo-acacia—*Locust tree.*

Locust tree, general name in the United States. *Yellow locust, red locust, black locust*, different names given to this tree on the Susquehannah, having regard to the varied color of the wood.

Robinia viscosa—*Rose-flowering locust.*

Rose-flowering locust, name given by M. Michaux to this tree in the Cherokee country, where it has no peculiar name. N. B. It has, however, been called so elsewhere.

Virgilia lutea—*Yellow wood.*

Yellow wood, name given to this tree in Tennessee.

Ulmus Americana—*White elm.*

White elm, general name given to this tree, in all parts of the United States where it grows. Michaux.

N. B. We doubt the generality of this application. It is new to us. It is generally called, in the vicinity of Boston, *American elm*, or simply *elm*.

Ulmus alata—*Wahoo.*

Wahoo, name given to this species in the maritime parts of the southern states.

Ulmus rubra—*Red elm.*

Red elm, most common name in all parts of the United States where it grows. *Slippery elm*, secondary name in New York and New Jersey. *Moose elm*, in the upper parts of New York. *Orme gras*, by the Illinois French.

Planera ulmifolia—*Planer tree.*

Planer tree, name given to it to preserve the memory of some individual. Michaux.

N. B. We are not told who this personage was, nor why the tree (as M. Michaux, in the French idiom remarks) was *consecrated* to him.

Populus tremuloides—*American aspen.*

American aspen, name given to this tree in the northern and middle states. Michaux. N. B. Sometimes called aspen poplar, and sometimes poplar only.

Populus grandidentata—*American large aspen.*

American large aspen, name given by M. Michaux to this species, which is ordinarily confounded with the preceding one.

Populus argentea—*Cotton tree.*

Cotton tree, known by this name on the Savannah river.

Populus hudsonica—*American black poplar.*

American black poplar, name given by M. Michaux to a species (as he says) before destitute of a name.

Populusmonilifera—*Virginian poplar.*

Virginian poplar, name given in Europe to this species.

Populus canadensis—*Cotton wood.*

Cotton wood, name given to this tree on the Mississippi, and the rivers which flow into it.

Populus angulata—*Carolinian poplar.*

Carolinian poplar, name given to it in Europe, because first brought from Carolina.

Populus Balsamifera—*Balsam poplar.*

Balsam poplar, known under this name in Canada.

N. B. It is probable M. Michaux means by this or the next, the tree which is called *black poplar*, *tacamahac*, and *balm of Gilead poplar* in the state of Massachusetts.

Populus candicans—*Heart-leaved balsam poplar.*

Heart-leaved balsam poplar.

N. B. If this is a different species from the last, it is the tacamahac of Massachusetts.

Tilia Americana—*Bass wood.*

Bass wood, prevailing name in the northern and middle states. *Lime*, name almost as frequent.

Tilia alba—*White lime.*

White lime, this species on the Ohio, is confounded with the last.

Tilia pubescens—*Downy lime tree.*

Downy lime tree, thus called in the southern states.

Alnus serrulata—*Common alder.*

Common alder, in all the United States.

Alnus glauca—*Black alder.*

Black alder, in Vermont.

Salix nigra—*Black willow.*

Black willow, general name in all the United States.

Salix ligustrina—*Champlain willow.*

Champlain willow, name given by M. Michaux, who found it on Lake Champlain in great plenty.

Salix lucida—*Shining willow.*

Shining willow, name given by M. Michaux.

From the Library of Useful Knowledge—Farmer's Series.

THE VICES, AND DISAGREEABLE OR DANGEROUS HABITS OF THE HORSE.

The horse has many excellent qualities, but he has likewise defects, and these occasionally amounting to vices. Some of them may be attributed to natural temper; for the human being scarcely discovers more peculiarities of habit and disposition, than does the horse. The majority of them, however, as perhaps in the human being, are consequences of a faulty education. Their early instructor has been both ignorant and brutal, and they have become obstinate and vicious.

Restifness.

At the head of the vices of the horse we place *restifness*, the most annoying, and the most dangerous of all. It is the produce of bad temper and worse education; and, like all other habits founded on nature and stamped by education, it is inveterate. Whether it appears in the form of kicking, or rearing, or plunging, or bolting, or in any way that threatens danger to the rider or the horse, it rarely admits of cure. A determined rider may, to a certain degree, subjugate the animal; or the horse may have his favorites, or form his attachments, and with some particular person he may be comparatively or perfectly manageable; but others cannot long depend upon him, and even his master is not always sure of him. We will speak of the most likely means of cure, or escaping from danger, as it regards the principal forms under which restifness displays itself; but we must premise as a rule that admits of very few exceptions that, he neither displays his wisdom, nor consults his safety, who attempts to conquer a restiff horse.

An excellent veterinary surgeon, and a man of great experience in horses, Mr. Castley, truly says, in 'The Veterinarian,' 'from whatever cause the vicious habits of horses may originate, whether from some mismanagement, or from natural badness of temper, or from what is called in Yorkshire a *mistetch*, whenever these animals acquire one of them, and it becomes in some degree confirmed, they very seldom, if ever, altogether forget it. In reference to driving, it is so true, that it may be taken as a kind of aphorism, that if a horse kicks once in harness, no matter from what cause, he will be liable to kick ever afterwards. A good coachman may drive him, it is true—and may make him go, but he cannot make him forget his vice; and so it is in riding. You may conquer a restiff horse; you make him ride quiet for months, nay, almost for years together, but I affirm, that under other circumstances, and at some future opportunity, he will be sure to return to his old tricks again.'

Mr. Castley gives two singular and conclusive instances of the truth of this doctrine. 'When a very young man,' says he, 'I remember purchasing a horse at a fair in the north of England, that was offered very cheap on account of his being unmanageable. It was said that nobody could ride him. We found that the animal objected to have any thing placed upon his back, and that, when made to move forward with nothing more than a saddle on, he instantly threw himself down on his side with great violence, and would then endeavor to roll upon his back.

'There was at that time in Yorkshire, a famous colt-breaker, known by the name of Jumper,* who was almost as celebrated in that country for taming vicious horses into submission, as the famed Whisperer was in Ireland. We put this animal into Jumper's hands, who took him away, and in about ten days brought him home again, certainly not looking worse in condition, but perfectly subdued and almost as obedient as a dog: for he would lie down at this man's bidding, and only rise again at his command, and carry double or any thing. I took to riding him myself, and may say, that I was never better carried for six or eight months, during which time he never showed the least vice whatever. I then sold him to a Lincolnshire farmer, who said that he would give him a summer's run at grass, and show him a very fine horse at the great Horncastle fair.

'Happening to meet this gentleman the following year, I naturally enough inquired after my old friend. "Oh!" said he, "that was a bad business —the horse turned out a sad rebel. The first time we attempted to mount him, after getting him up from grass, he in an instant threw the man down with the greatest violence, pitching him several yards over his head: and after that he threw every one that attempted to get on his back. If he could not throw his rider, *he would throw himself down*. We could do nothing with him, and I was obliged at last to sell him to go in a stage-coach." '

* Those of our readers who were connected with the contested elections for Yorkshire, will recollect Jumper, covered with orange plush from top to toe, and scampering in every direction over the country. Sometimes he would exchange this for a bear-skin, enveloped in which, and mounted occasionally on a buffalo, he was a most formidable object. He had extraordinary power over animals of various species, for he tamed to the saddle a buffalo for Mr. Tempest, and a pair of rein-deer for harness for Lord Fitzwilliam. But his charm consisted chiefly in fearlessness, and brute force, accompanied by considerable tact. He would generally try rough measures first; and in his perilous encounters with some of his troublesome scholars, had nearly every bone in his body fractured. Sullivan's method was altogether different—force was rarely resorted to. The enemy surrendered to him at discretion and without a struggle. Jumper, however, seemed to have some charm about him, for when he had, by dint of punishment, striven in vain to conquer an unruly horse in the market-place of Wakefield—he alighted—stood on the near side of the horse—brought the animal's head almost back to his off shoulder by forcibly pulling at the off rein, and then sternly gazed at him over the withers for two or three minutes. The animal began to tremble, and broke out into a profuse perspiration. Jumper then loosened his hold of the rein, and patted and caressed the horse, who immediately followed him round the market-place perfectly tamed.

In the next story, Jumper's counterpart and superior, the Irish Whisperer, is brought on the stage, and, although he performs wonders, *he* cannot radically cure a restiff horse. 'At the Spring Meeting of 1804, Mr. Whalley's *King Pippin* was brought on the Curragh of Kildare to run. He was a horse of the most extraordinary savage and vicious disposition. His particular propensity was that of *flying at and worrying* any person who came within his reach, and if he had an opportunity, he would get his head round, seize his rider by the leg with his teeth, and drag him down from his back. For this reason he was always ridden in what is called *a sword;* which is nothing more than a strong flat stick, having one end attached to the cheek of the bridle, and the other to the girth of the saddle, a contrivance to prevent a horse of this kind from getting at his rider.

'King Pippin had long been difficult to manage and dangerous to go near, but on the occasion in question he could not be got out to run at all. *Nobody could put the bridle upon his head.* It being Easter Monday, and consequently a great holyday, there was a large concourse of people assembled at the Curragh, consisting principally of the neighboring peasantry; and one countryman, more fearless than the rest of the lookers-on, forgetting, or perhaps never dreaming that the better part of courage is discretion, volunteered his services to bridle the horse. No sooner had he committed himself in this operation, than King Pippin seized him somewhere about the shoulders or chest, and says Mr. Watts (Mr. Castley's informant,) "I know of nothing I can compare it to, so much as a dog shaking a rat." Fortunately for the poor fellow, his body was very thickly covered with cloths, for on such occasions an Irishman of this class is fond of displaying his wardrobe, and if *he has three coats at all in the world*, he is sure to put them all on.

'This circumstance in all probability saved the individual who had so gallantly volunteered the forlorn hope. His person was so deeply enveloped in extra-teguments, that the horse never got fairly hold of his skin, and I understand that he escaped with but little injury, beside the sadly rent and totally ruined state of his holyday toggery.

'The Whisperer was sent for, who having arrived, was shut up with the horse all night, and in the morning he exhibited this hitherto ferocious animal, following him about the course like a dog —lying down at his command—suffering his mouth to be opened, and any person's hand to be introduced into it—in short, as quiet almost as a sheep.

He came out the same meeting, and won a race, and his docility continued satisfactory for a long time; *but at the end of about three years his vice returned*, and then he is said to have *killed a man*, for which he was destroyed.'

It may not be uninteresting in this connexion, to give some account of this tamer of quadruped vice. However strange and magical his power may seem to be, there is no doubt of the truth of the account that is given of him. The Rev. Mr. Townsend, in his Statistical Survey of Cork, first introduced him to the notice of the public generally, although his fame had long spread over that part of Ireland. We, however, give the following extract from Croker's Fairy Legends and

Traditions of Ireland, Part II. p. 200, for the fact seems the work of some elfin sprite, rather than of a rude and ignorant horse-breaker.

'He was an awkward, ignorant rustic of the lowest class, of the name of Sullivan, but better known by the appellation of the Whisperer; his occupation was horse-breaking. The nickname he acquired from the vulgar notion of his being able to communicate to the animal what he wished by means of a whisper, and the singularity of his method seemed in some degree to justify the attribute. In his own neighborhood, the notoriety of the fact made it seem less remarkable, but I doubt if any instance of similar subjugating talent is to be found on record. As far as the sphere of his control extended, the boast of *veni, vidi, vici*, was more justly claimed by Sullivan than by Cæsar himself.

'How his art was acquired, and in what it consisted, is likely to be for ever unknown, as he has lately (about 1810) left the world without divulging it. His son, who follows the same trade, possesses but a small portion of the art, having either never learned the true secret, or being incapable of putting it into practice. The wonder of his skill consisted in the celerity of the operation, which was performed in privacy without any apparent means of coercion. Every description of horse, or even mule, whether previously broken or unhandled, whatever their peculiar habits or vices might have been, submitted without show of resistance to the magical influence of his art, and in the short space of half an hour became gentle and tractable. This effect, though instantaneously produced, was generally durable. Though more submissive to him than to others, they seemed to have acquired a docility unknown before.

'When sent for to tame a vicious beast, for which he was either paid according to the distance, or generally two or three guineas, he directed the stable, in which he and the object of the experiment were, to be shut, with orders not to open the door until a signal was given. After a *tête-à-tête* of about half an hour, during which little or no bustle was heard, the signal was made, and, upon opening the door, the horse appeared lying down, and the man by his side, playing with him like a child with a puppy dog. From that time he was found perfectly willing to submit to any discipline —however repugnant to his nature before.' 'I once,' continues Mr. Townsend, 'saw his skill tried on a horse, which could never before be brought to stand for a smith to shoe him. The day after Sullivan's half hour's lecture, I went, not without some incredulity, to the smith's shop, with many other curious spectators, where we were eye-witnesses of the complete success of his art. This, too, had been a troop horse, and it was supposed, not without reason, that after regimental discipline had failed, no other would be found availing. I observed that the animal appeared terrified whenever Sullivan either spoke or looked at him; how that extraordinary ascendancy could have been obtained, is difficult to conjecture.

In common cases this mysterious preparation was unnecessary. He seemed to possess an instinctive power of inspiring awe, the result, perhaps, of natural intrepidity, in which, I believe, a great part of his art consisted; though the circumstance of the *tête-à-tête* shows that, on particular occasions, something more must have been added to it. A faculty like this would in some hands have made a fortune, and I understand that great offers were made to him, for the exercise of his art abroad. But hunting was his passion. He lived at home in the style most agreeable to his disposition, and nothing could induce him to quit Duhallow and the fox hounds.'

Mr. Castley witnessed the total failure of the younger Sullivan. He says, 'we have in the regiment a remarkably nice horse, called Lancer, that has always been very difficult to shoe, but seven or eight years ago, when we first got him, he was downright vicious in that respect. When the regiment was stationed at Cork, the farrier-major sought out the present Sullivan, the son of the celebrated Whisperer, and brought him up to the barracks in order to try his hand upon Lancer, and make him more peaceable to shoe; but I must say this person did not appear to possess any particular controlling power over the animal, more than any other man. Lancer seemed to pay no attention whatever to his charm, and, at last fairly beat him out of the forge. Time, however, and a long perseverance in kind and gentle treatment, have effected what force could not. The horse is now pretty reasonable to shoe.'

Backing or gibbing.

One of the first species of restiffness, taking them in alphabetical order, is backing or gibbing. These are so closely allied that we hardly know how to separate them. Some horses have the habit of backing at first starting, and that more from playfulness than desire of mischief. A moderate application of the whip will usually be effectual. Others, even at starting, exhibit considerable obstinacy and viciousness. This is frequently the effect of bad breaking. Either the shoulder of the horse had been wrung when he was first put to the collar, or he had been foolishly accustomed to start in the break *up hill*, and, therefore, all his work coming upon him at once, when it being much more difficult to draw the break up-hill, than to back and let it run down-hill, he gradually acquired this dangerous habit.

A hasty and passionate breaker will often make a really good tempered young horse an inveterate gibber. Every young horse is at first shy of the collar. If he be too quickly forced to it, he will possibly take a dislike to it, that will occasionally show itself in the form of gibbing as long as he lives. The judicious horse-breaker will resort to no severity, even if the colt should go out several times without touching collar. The example of his companion will ultimately induce him to take to it voluntarily and effectually.

A large and heavy stone should be put behind the wheel before starting, when the horse, finding it more difficult to back than to go forward, will gradually forget this unpleasant trick. It will likewise be of advantage, as often as it can be managed, so to start that the horse shall have to back up-hill. The difficulty of accomplishing this will soon make him readily go forward at once. A little coaxing, or leading, or moderate flagellation, will assist in accomplishing the cure.

When, however, a horse, thinking that he has had enough of work, or has been improperly checked or corrected, or beginning to feel the painful pressure of the collar, swerves, and gibs, and backs, it is a more serious matter. Persuasion should here first be tried; and, afterwards, reasonable coercion, but no cruelty: for the brutality which is often exercised in attempting to compel a gibbing horse to throw himself habitually into the collar, never yet accomplished the purpose. The horse may, perhaps, be whipped into motion, but if he has once begun to gib, he will have recourse to it again whenever any circumstance displeases or annoys him; and the habit will be rapidly, and so completely formed, that he will become insensible to all severity.

It is useless and most dangerous to contend with a horse determined to back, unless there is plenty of room, and, by tight reining, the driver can make him back in the precise direction he wishes, and especially up-hill. Such a horse should be immediately sold, or turned over to some other work. In a stage-coach as a wheeler, and particularly as the near-wheeler; or, in the middle of a team at agricultural work, he may be serviceable. It will be useless for him to attempt to gib there, for he will be dragged along by his companions whether he will or no; and, finding the inutility of resistance, he will soon be induced to work as well as any horse in the team. This reformation will last while he is thus employed, but, like restiness generally, it will be delusive when the horse returns to his former occupation. The disposition to annoy will very soon follow the power to do it. Some instances of complete reformation have occurred, but they have been rare.

When a horse, not often accustomed to gib, betrays a reluctance to work, or a determination not to work, common sense and humanity will demand that some consideration should be taken, before measures of severity be resorted to. The horse may be taxed beyond his power. He soon discovers whether this is the case, and by refusing to proceed, tells his driver that it is so; and the utmost cruelty will not induce many horses to make the slightest effort, when they are conscious that their strength is inadequate to the task. Sometimes the withers are wrung, and the shoulders sadly galled; and the pain, which is intense on level ground and with fair draught, becomes insupportable when he tugs up a steep acclivity. These things should be examined into, and, if possible, rectified; for, under such circumstances, cruelty might produce obstinacy and vice, but not willing obedience.

Those who are accustomed to horses know what seemingly trivial circumstances occasionally produce this vice. A horse, whose shoulders are raw, or that have frequently been so will not start with a cold collar. When the collar has acquired the warmth of the parts on which it presses, the animal will go without reluctance. Some determined gibbers have been reformed by constantly wearing a false collar, or strip of cloth round the shoulders, so that the coldness of the usual collar should never be felt; and others have been cured of gibbing by keeping the collar on night and day, although the animal is not able to lie down so completely at full length, which the tired horse is always glad to do. When a horse gibs, not at starting but while doing his work, it has sometimes been useful to line the collars with cloth instead of leather; the perspiration is readily absorbed, the substance which presses on the shoulders is softer, and it may be far more accurately eased off at a tender place.

Biting.

This is either the consequence of natural ferocity or a habit acquired from the foolish and teasing play of grooms and stable boys. When a horse is tickled and pinched by thoughtless and mischievous youths, he will first pretend to bite his tormentors; by degrees he will proceed further, and actually bite them, and, very soon after that, he will be the first to challenge to the combat, and without provocation seize some opportunity to gripe the incautious groom; and then, as the love of mischief is a propensity too easily acquired, this war half playful, and half in earnest, will become habitual to him, and will degenerate into absolute viciousness. Nothing can here be done in the way of cure; kindness would aggravate the evil, and no degree of severity will correct it. Prevention, however, is in the power of every proprietor of horses. While he insists on gentle and humane treatment of his cattle, he should systematically forbid this horse-play. It is that which can never be considered as operating as a reward, and thereby rendering the horse tractable; nor does it increase the affection of the animal for his groom, because he is annoyed and irritated by being thus incessantly teased.

Getting the cheek of the bit into the mouth.

Some horses that are disposed to be mischievous try to do this, and are very expert at it. They soon find what advantage it gives them over their driver; who by this manœuvre loses almost all command. Harsh treatment is here completely out of the question. All that can be done is, by some mechanical contrivance, to render the thing difficult or impossible, and this may be managed by fastening a round piece of leather on the inside of the cheek of the bit.

Kicking.

This, as *a vice*, is another consequence of the culpable habit of grooms and stable-boys of teasing the horses. That which is at first an indication of annoyance at the pinching and tickling of the groom, and without any design to injure, gradually becomes the expression of anger, and the effort at mischief. There is no cure for this vice; and he cannot be justified who keeps such a kicking horse in his stable.

Some horses acquire a habit of kicking at the stall or the bail, and particularly at night, from mere irritability and fidgettiness. The neighboring horses are disturbed, and the kicker gets swelled hocks, or some more serious injury. This is also a habit very difficult to correct if suffered to become established. Mares are far more subject to it than horses.

Before the habit is inveterately established, a thorn bush or a piece of furze fastened against the partition or post will sometimes effect a cure. When the horse finds that he is pretty severely pricked he will not long continue to punish himself. In confirm cases it may be necessary to have recourse to the log, but the legs are often not a little bruised by it. A rather long and heavy piece of wood attached to a chain is buckled above the hock, so as to reach about half way down the leg. When the horse attempts to kick violently, his leg will receive a severe blow from this, and the repetition of the blow will soon teach him to be quiet.

A much more serious vice is kicking in harness. From the least annoyance about the rump or quarters, some horses will kick at the most violent rate, and destroy the bottom of the chaise, and endanger the limbs of the driver. Those that are fidgetty in the stable are most apt to do this. If the reins should perchance get under the tail, the violence of the kicker will be most outrageous; and while the animal presses down his tail so tightly that it is almost impossible to extricate the reins, he continues to plunge until he has demolished every thing behind him.

This is a vice standing foremost in point of danger, and which no treatment will often conquer. It will be altogether in vain to try coercion here. If the shafts are very strong and without flaw, or if they are plated with iron underneath, and a stout kicking strap used, which will barely allow the horse the proper use of his hind limbs in progression, but not permit him to raise them sufficiently for the purpose of kicking, he may be prevented from doing mischief; or if he is harnessed to a heavy cart, and thus confined, his efforts to lash out will be restrained: but it is a very unpleasant thing frequently to witness these attempts, although ineffectual, to demolish the vehicle; and the shafts or the kicking strap may possibly break, and extreme danger may ensue. A horse that has once begun to kick, whatever may have been the original cause of it, can never be depended on again; and he will be very unwise who ventures behind him.

Unsteadiness whilst being mounted.

When this merely amounts to eagerness to start (very unpleasant, indeed, at times, for many a rider has been thrown from his seat before he was fairly fixed in it,) it may be remedied by an active and good horseman. We have known many instances in which, while the elderly, and inactive, and fearful man, has been making more than one ineffectual attempt to vault into the saddle, the horse has been dancing about to his annoyance and danger; but the animal had no sooner been transferred to the management of a younger and more agile rider, than he became perfectly subdued. Severity will here, more decidedly than in any other case, do harm. The rider should be fearless—he should carelessly and confidently approach the horse, mount at the first effort, and then restrain him for a while, patting him, and not suffering him to proceed until he becomes perfectly quiet. These horses should not be too highly fed, and should daily have sufficient exercise.

When the difficulty of mounting arises not from eagerness to start, but unwillingness to be ridden, the sooner such horse is disposed of the better. He may be conquered by a determined rider, but a skilful and determined horseman alone will manage him; and even he will not succeed without frequent and even dangerous contests that will mar all the pleasure of the ride.

Rearing.

This sometimes results from playfulness, carried indeed to an unpleasant and dangerous extent; but it is oftener a vice, and is a desperate and frequently successful effort to unhorse the rider. The horse that has twice decidedly and dangerously reared, should never be trusted again, unless indeed it be the fault of the rider—unless he has been using a deep curb and sharp bit. Some of the best horses will contend against these, and then rearing may be immediately and permanently cured by using a snaffle bridle alone.

The horse-breaker's remedy, that of pulling the horse backward on a soft piece of ground, is worthy of him, and would be practised only by reckless and brutal men. Many horses have been injured in the spine, and others have broken their necks, by being thus suddenly brought over; while even the horse breaker, who fears no danger, is not always able to extricate himself from the falling horse. If rearing proceeds from vice, and is unprovoked by bruising and laceration of the mouth, it fully partakes of the inveteracy which attends the other divisions of restiveness.

Running away.

Some headstrong horses will occasionally endeavor to bolt with the best rider. Others, with their best wonted sagacity, endeavor thus to dislodge the timid or unskilful. Some are hard to hold, or bolt only during the excitement of the chase; others will run away, prompted by a vicious propensity alone. There is no cure here. That method which affords any probability of success, is to ride such a horse with a strong curb and sharp bit; to have him always firmly in hand; and if he will run away, and the place will admit of it, to give him (sparing neither curb, whip, nor spur) a great deal more running than he likes.

Vicious to clean.

It would scarcely be believed to what an extent this exists in some horses, that are otherwise perfectly quiet. It is only at a great hazard that they can be cleaned at all. The origin of this is probably some maltreatment. There is a great difference in the sensibility of the skin in different horses. Some seem as if they could scarcely be made to feel the whip; others cannot bear a fly to alight on them without the expression of annoyance. In young horses the skin is peculiarly delicate. If they have been curried with a broken comb, or hardly rubbed with an uneven brush, the recollection of the torture they have felt makes them impatient, and even vicious, during every succeeding operation of the kind. Many grooms, likewise, seem to delight in producing these exhibitions of uneasiness and vice; although when they are carried a little too far, and to the hazard of the limbs of the groom, the animals that have been almost tutored into these expressions of irritation, are brutally kicked and punished.

This, however, is a vice which may be conquered. If the animal be dressed with a lighter hand, and wisped rather than brushed, and the places where the skin is most sensitive be avoided as much as thorough cleanliness will allow, the horse will gradually lose the recollection of former ill-treatment, and become tractable and quiet.

Vicious to shoe.

The correction of this is more peculiarly the business of the smith; yet the master should diligently concern himself with it, for it is oftener the consequence of injudicious or bad usage than of natural vice. It may be expected that there will be some difficulty in shoeing a young horse for the first few times. It is an operation which gives him a little uneasiness. The man to whom he is most accustomed should go with him to the forge: and if another and steady horse were shod before him, he might be induced more readily to submit. We cannot deny, that after the habit of resisting this necessary operation is formed, force may sometimes be necessary to reduce our rebellious servant to obedience; but we affirm that the majority of horses *vicious to shoe* are rendered so by harsh usage, and by the pain of correction being added to the uneasiness of shoeing. It should be a rule in every forge that no smith should be permitted to strike a horse, much less to twitch or to gag him, without the master-farrier's order, and that a young horse should never be twitched or struck. There are few horses that may not be gradually rendered manageable for this purpose by mildness and firmness in the operator. They will soon understand that no harm is meant, and they will not depart from their usual habit of obedience; but if the remembrance of corporeal punishment is connected with shoeing, they will always be fidgety, if not dangerous.

This is a very serious vice, for it not only exposes the animal to occasional severe injury from his own struggles, but also from the correction of the irritated smith, whose limbs, and even whose life being in jeopardy, may be forgiven if he is sometimes a little two hard-handed. Such a horse is very liable, and without any fault of the smith, to be pricked and lamed in shoeing; and if the habit should be confirmed, and should increase, and it at length becomes necessary to cast him, or to put him in the trevis, the owner may be assured that many years will not pass ere some formidable and even fatal accident will take place. If therefore, mild treatment will not correct the vice, the horse cannot be too soon got rid of.

AMHERST TILLAGE.

To the Editor of the Farmers' Register.

Amherst, May 15th, 1835.

I am pleased with the Register, and believe it calculated to do much good, if our farmers would read it. I am sorry you have so few subscribers from this section, lying under the mountain, to contribute to fill its valuable columns. The desire to improve is confined to a few, and they pretty much scattered through the county—and unless a different spirit should pervade the cultivators of the soil, the west must still continue to be the final home for very many of them. I consider that the present rise in the price of tobacco will be of serious disadvantage to the small spirit of improvement that exists amongst us. All the manure on the farms, which should be applied to reclaiming the worn out parts of the land, so that the clover would take, is now applied to making tobacco; and many will even raise tobacco to buy corn. We should be glad (some of us at least) if the "Gleaner" would take an excursion through this section; as his observations upon the state of agriculture in Albemarle gave several valuable hints for the improvement of our farms.

As I wish to sow the orchard grass, and am unacquainted with the quantity that it would be proper to sow to the acre, and when it should be sown, I should be glad, if you can give the information, you would do so—if not, perhaps some of your subscribers can.

AN AMHERST FARMER.

For the Farmers' Register.

TO KILL PERSIMMON BUSHES.

Fauquier, April 28th, 1835.

Governor Barbour in his address to the Agricultural Society of Albemarle, says, "but as yet I have found no satisfactory plan, by which successfully to root out the annoying growth to which I have referred. Severe grazing will in time, pretty effectually destroy all but the *persimmon;* nothing will eat that. And for one I am ready to pronounce him a benefactor, who will discover an effectual method of destroying it." Without intending to put in a claim for an obelisk, or a statue, or for any other memorial of my being than a small hillock in the orchard, or under the cedars of Black River, where my ancestors lie, I will inform him of what I deem to be an effectual method of destroying the persimmon bush: it is simple and cheap. From the 20th of June to the 20th of August, strip them of their leaves, taking care to pull the buds off. Where this is well done, the bush will die. They should be stripped in the field the year before it is fallowed for wheat, or the second year before it is put in corn. All bushes that are well stripped will die the first year—those that are not, should be stripped the second time. The small limbs may be pulled off.

R. W.

For the Farmers' Register.

WHEAT CROP IN MONTGOMERY, MD.

Montgomery County, Md., May 25th, 1835.

The crops of grain were never more unpromising in this neighborhood, and the season is now so far advanced that there is little hopes of their recovery. I have a small lot of three acres, upon which last year I put three hundred large cart loads of farm-pen manure—ploughed it deep with three horses, and cultivated it in potatoes. The crop of potatoes, in consequence of the dry season, was very inferior. Early in the month of November I dug the potatoes—removed all the vines and litter of every description—ploughed it with a large three-horse plough—which brought the manure which had been turned down in the spring, to the surface, finely rotted. I then harrowed it twice—sowed on it ten bushels of blue stem wheat, and shovelled it in with the double shovel plough, leaving it in nicer order than any piece of land that I had ever prepared, and calculated confidently on forty bushels of wheat per acre. From its present appearance, I should say, it would not make ten per acre, and I am confident I have no acre of land on my farm that would not, in a tolerable wheat year with common preparation, produce double. I mention this to show the complete failure this year, under apparently, the most favorable circumstances.

J——— P———.

From the Horticultural Register.

ON THE CULTURE OF MILK-WEED.—(*Asclepias Syriaca.*)

Some four or five years since, in a conversation with George Manners, Esq. the British Consul for Massachusetts, on the various kinds of edible vegetables, cultivated in our gardens, he observed that, during a recent visit to Canada, he was informed that the young shoots of the milk-weed were used as a substitute for asparagus, and asked me if I had ever heard of their being cooked in the United States. I replied, that I perfectly recollected, when a boy, my mother often had them gathered from the fields and road-sides, with the dandelion, shepherds' sprouts, nettles, and other plants, which were collected as greens; but that I had never seen the plant thus used elsewhere, or heard it named as a culinary vegetable; but that I certainly would make an experiment in its cultivation, and as to its qualities, as an addition to our garden pot herbs.

Having collected the seed in the autumn, it was sown early in the spring in drills, and covered an inch deep. They came up freely in four or five weeks, and when the plants were two years old, I took up a portion of the roots, and set them out about eight inches apart, in a trench six inches deep. The ground had been manured and thoroughly dug over, previously to forming the trench. The following spring, when the shoots were four or five inches high, they were cut, tied up in bunches, boiled and served up with melted butter, like asparagus; and they were as tender, and to my taste quite as delicious a vegetable, resembling in flavor the youngest and most delicate string beans.

As the plant is very hardy, exceedingly prolific, easily cultivated, and such a valuable addition to our early vegetables, I consider a bed of it nearly as desirable as one of asparagus.

No better mode of cultivation can be adopted, than that for asparagus, as described by Mr. Chandler, in his interesting, instructive, and able article, which appeared in the third number of the Horticultural Register*—except the roots of the milk-weed should not be covered more than five or six inches deep.

* * * * *

Asclepias (*Swallow-wort,*) is a numerous genus of plants, there being forty-two species, which have been described by botanists, two of which only are found in Europe, but three in South America, while there are eighteen indigenous to the United States, and the others are divided between the West Indies and Africa. Many of the varieties are cultivated as ornamental plants in England and France, but the following kinds, natives of this country, are considered the most beautiful, besides being more hardy than those of more southern climes; still many of the latter are considered worthy of the green-house.

1. *Muschata,* so called by Bartram, for its strong and agreeable musk scent, is peculiar to the natural meadows of South Carolina, Georgia, and Florida. It is a low plant, of not more than five or six inches in height, with flowers of a pale green color, inclining to yellow.

2. *Venosa* has leaves elegantly variegated with white and crimson veins, and the stems terminate in an umbel of pale flesh-colored flowers.

3. *Pulchra*—water-silk-weed—has nearly erect stems, four or five feet high; umbels very small; flowers crimson purple. Grows on low, wet land, by the side of ponds.

4. *Variegata*—variegated. Leaves rough, umbels compact and come out from the side of the stalk; flowers of an herbaceous odor.

5. *Nivea*—white, or almond-leaved. Stalks two feet high, and of a dark green. Leaves deep green above, and pale beneath, smooth and rather stiff. Flowers green, with white nectaries.

6. *Incarnata*—flesh-colored—has several upright stalks about two feet high, at the top of which are produced close umbels of purple flowers. Blooms in August.

7. *Decumbens.* The stalks are declining, hairy, a foot and a half high; leaves narrow; umbels compact, at the extremity of the branches; flowers a bright orange color.

8. *Verticillata.* Stalks slender, upright; umbels at the extremity of the stems; leaves in whorls of four, five, and six together; flowers small and of a greenish white color. Found in Roxbury and Dedham; blooms in July.

9. *Tuberosa*—butterfly-weed. Root large, fleshy, branching and somewhat fusiform, but it is only by comparison with other species that it can be called tuberous; stems numerous, growing in bunches from the root, hairy and dusky red; flowers numerous, erect, and of a beautiful bright orange color; grows in Woburn and Newton; blooms in August.

10. *Obtusifolia*—blunt-leaved. Stems erect, supporting a terminal umbel, at a distance from the leaves, which are opposite, ovate, heart shaped at the base flowers large, of a greenish white, tinged with red; it is found in Cambridge and Mount Auburn; blooms in July.

11. *Phytolaccoides*—poke-leaved. A tall, large flowering species, of a delicate appearance; stem erect, four or five feet high; leaves large; umbels nodding, flowers large, petals green, nectaries white or flesh colored; grows in low grounds, blooms in June.

12. *Purpurescens*—dark-flowered. Stem erect; flowers of a dark crimson purple; grows in Cambridge and Newton, but is rare.

13. *Quadrifolia*—four-leaved. A delicate species, growing in dry woods; stem about a foot high; flowers flesh colored; is found in Roxbury and Brookline, and blooms in June.

14. *Veridifolia*—Green flowered. An inelegant species, with small greenish umbels; is found in Leicester; blooms in July.

For the description of the third and sixth preceding species, I am indebted to Dr. Bigelow's excellent work, on the plants in the environs of Boston. There is a beautiful colored engraving of No. 9, and a more particular account of it, in his other most able and splendid publication, called Medical Botany.

15. *Amoena*—oval-leaved. Stalks from a foot and a half to three feet high; at each joint are two large leaves, which are blunt, thickish, stiff, smooth, with purple nerves; umbels rise from the top of the stalk and some of the upper axils; flowers of a bright purple color.

16. *Rubra*—red-flowered. Stem upright; um-

* Republished in Farmers' Register, p. 675 Vol. II.

bels many, from the same common peduncle; a native of Virginia.

17. *Parviflora*—small-flowered. A native of South Carolina and Florida.

18. *Syriaca*—milk-weed, or silk-weed. This species abounds all over our country, and for the many useful purposes to which it may be applied, is deserving of especial attention. The root is perennial, and in April or May throws out, like asparagus and hops, a great number of shoots; the stems rise to six or seven feet in height in a rich soil. When the leaves or stems are broken off, a milky substance, of a viscous consistence, exudes, from whence the plant derives one of its most general trivial names. The flowers appear in July, and are in umbels of from twelve to sixteen on one stem, each containing thirty or forty single flowers, which adhere to the umbel by a long slender stalk, and has a sweetish odor. Each bunch of flowers is succeeded by three, four, and sometimes ten long, flat and rough pods, which enclose numerous round, flat, thin, yellowish brown seeds, wrapped up in a beautiful shining white and soft kind of silk, which constitutes their wings, and by means of which they are conveyed with ease to a great distance by the wind; it has also given rise to the other trivial name, by which the plant is known in some parts of the country.

The great utility of the Syriaca or milk-weed in the arts, has not been understood but since the middle of the last century, although it was introduced into Europe at a much earlier period.

A manufactory of articles from the silk was established in Paris in 1760, and it has long been employed at Louzanne, with advantage, as candle-wicks. Mr. Schneider of Liegnitz, has been distinguished for the zeal he has evinced, in relation to the cultivation and preparation of this article, and has recommended it in two different pamphlets.

In the application of it to paper making, Mr. Schmid of Lunenburg made a variety of very interesting and instructive experiments.

The cultivation of the plant has been found very easy. Mr. Schneider began in 1785, with but six plants, and in 1793 he had a plantation of 30,000, which yielded him 800 pounds of silk the first crop, 355 the second, and 600 the third. They were planted in rows about two feet apart, with a sufficient distance between the roots in each row. The silk was separated into two parts, the longer being used for spinning, and the shorter for hat making and beds.

Mr. Schmid, who was an ingenious manufacturer of paper, made several experiments with the capsules, or pods, which gave the following results:

1. From the interior white rind of the pods he obtained writing paper, pretty white, of good quality, and similar to the silk paper of the Chinese.

2. From the external green part of the pods, a greenish colored paper was made, which, when sized, was stronger than paper made from rags. It was almost as close in its texture as parchment, and even when unsized did not suffer the ink to pass through it. It was excellent wrapping paper.

3. From the bark of the stems he obtained a paper so like, in every thing, to paper made from rags, that the difference could scarcely be distinguished.

The silk when taken from the pods, and being freed from the seeds, is hung up in thin bags in the sun, and when perfectly dry, may be used without any further preparation, instead of feathers, horse hair, wool, or cotton, for cushions, bolsters, pillows, mattresses, and coverlets. From eight to nine pounds is sufficient for a bed, bolster, and two pillows. It is lighter and warmer, when used in forming coverlets or comforters, than cotton or wool, and is nearly equal to eider-down.

For spinning, the staple of the silk is too short, when taken alone, and therefore is combined with flax, wool, cotton, or raw silk.

One-third of this silk, with two-thirds of cotton, forms a very excellent mixture for gloves, stockings, and other articles of like manufacture. One part of this silk and two of rabbit's fur, forms hats exceedingly light, soft to the touch, glossy, and which have a great resemblance to beaver hats.

The plant throws around it, long roots with new eyes; these can be cut off in autumn or early in the spring, before the milk flows, and may be divided into pieces from four to six inches long, which may be planted in trenches, four or five inches deep, in an oblique position, with the eyes or buds standing up.

Where the plant grows wild in abundance, a bed for culinary purposes could be easily formed, from the roots in the manner above described, and would be fit for use the second spring; by which two years would be gained over plants raised from the seed.

Besides the above named articles manufactured from the silk, I recollect having seen, at several of the annual exhibitions of the Massachusetts Agricultural Society, in Brighton, tippets, capes, bonnets, and various other articles, which were very beautiful. They were formed by sewing the tufts of silk by the part which is attached to the seed, to linen, cotton, or silk cloth in rows, one overlapping the other, like the shingles on a roof. They had the appearance of the most delicate and rich fur; and so simple was the work that a child could execute it.

For embellishing the outer borders of pleasure grounds, the skirts of roads, avenues, clumps of trees, the sides of groves, and to intermingle with shrubs, all the American varieties may be used with picturesque effect.

On examining some botanical works since writing the above, I found that Parkinson had received the *Syriaca* from this country, and cultivated it in his botanical garden of rare plants, as early as 1629. He called it Virginia silk, and it was stated that the French Canadians were in the habit of eating the tender shoots as substitutes for asparagus.

It is but little trouble to form in every garden, side by side, beds of dandelions, sea-kale, milk-weed, and asparagus, which, from the last of March, until the green peas appear, will afford a daily and various supply of delicious vegetables. They are all perennial plants, and when once set out, and properly taken care of in autumn and spring, will yield abundant crops, for all time, without removal.

H. A. S. DEARBORN.

Roxbury, March 9th, 1835.

[Judging from the foregoing description, and without the sure guidance of botanical knowledge, we infer that the plant in question is one which we have long known as a very troublesome weed in wet meadows kept for mowing. The only doubt as to the identity of the two, arises from our never having known the weed on dry land. It grew well on a piece of marshy meadow subject to be covered (though rarely,) by high tides, and so saturated with spring as well as tide-water as to be unfit for any thing but meadow. The abundance of the plants, the fruitless trouble of grubbing which they caused, and the remarkable beauty of the silky wings of the seeds, all served to attract much attention at the time—though, as some years have since passed, our recollection may not be perfectly accurate. But what we then deemed the most important quality of the plant, is not noticed in the description above. The bark of the stalk is like that of hemp and flax, and was thought to be superior to either; and even when stripped after exposure through all the winter, possessed so much strength, that we formed the opinion that the plant would be valuable to be cultivated for this product. But its supposed unfitness for dry soils, and the trouble of tillage on wet ones, prevented any action on that opinion. Some of our correspondents who are better informed will oblige us by stating whether this plant is the Asclepias Syriaca, and whether the strength, and fineness of the fibres of its bark, and their fitness for being made into cloth, have ever attracted notice.

Loudon's Encyclopædia of Plants states that plants of the genus Asclepias "thrive best in *peat* or any very light soil." If *peat* in its natural wet state is meant, it adds support to our opinion of the most suitable soil for this plant. The third species named above, *A. Pulchra,* water silk-weed, may be the kind we knew.]

From the Franklin Mercury.

PALM LEAF HATS.

The braiding of these hats is an important and increasing business, which has sprung up within ten years past, and which is doubly valuable in consideration of its moral influence, inasmuch as it offers a remunerating *domestic* employment for thousands of our industrious country women. Few are aware of the extent to which the manufacture is carried on in the country towns. In Ashby in Middlesex county, according to the Yeoman's Gazette, 50,000 hats are braided annually, for which the braiders (more than half of whom are girls and small boys) receive between six and seven thousand dollars. This is not a high compensation for the amount of labor bestowed; but the advantage is that this labor may be bestowed at odd times, and by those who might otherwise remain unemployed. In Petersham and Barre, in Worcester county, great numbers have been made. We have been told that a single commission house in New York, sold hats made in that county in one year, to the amount of ninety thousand dollars. The southern market was for a great while the principal outlet; the sales have fluctuated considerably, and the prices have been gradually coming down. Recently, large quantities were shipped to France and sold readily and with profit, at one quarter of the rate at which the English had been in the habit of selling an article not as handsome, though rather more substantial. The French government have somewhat checked the trade, by imposing a duty of one franc (about twenty cents) on the finer kinds of these hats; the consequence is, that the common ones are now principally sought for export.

In this county the business has been prosecuted to some extent. A dealer in this town, who commenced a few weeks since, has already a hundred and fifty braiders employed. In Shelburne and in other towns we believe that a considerable number are made.

From the Tennessee Farmer.

CURING CLOVER HAY.

As the season for curing clover hay in many parts of the country will probably have arrived, before our number for May can reach many of our subscribers, we have thought it desirable to insert in this number some directions respecting the mode of curing it. We give the course to which we have been accustomed, and add an article from the Albany Cultivator on the subject, which we particularly recommend to the attention of our readers, and we earnestly beg them to test the mode therein recommended, by actual experiment, and to apprise us of the result. If that mode will succeed with us, to the extent described in the article, it is, we have no doubt, greatly to be preferred to the one, which we describe—and that we know to be incomparably superior to the old mode, still practiced by some.

Clover hay should never be scattered out of the swath, because, in addition to the labor lost in scattering and again raking up, the hay is thereby greatly injured. Indeed, if the weather be favorable for curing, neither timothy nor any other kind of hay should be scattered, because, the less any grass is exposed to the sun and air in the process of curing, the greater will be the value of the hay, and the less the labor required.

Let the clover lie in the swath untouched, until about two-thirds of the upper part be sufficiently cured, which, in good weather, will, if the swath be tolerably heavy, be effected in eight or ten hours; if the swath be light, in a proportionably shorter time: when thus cured, turn the swath bottom upwards with the fork, an operation speedily performed. Let it then lie exposed to the sun until the under side be cured, which will be, according to the thickness of the swath, in from four to six hours, then throw three swaths together in windrows, and commence hauling in, the wagon running between two windrows and loading from each. It can hardly be necessary to observe, that all these operations must be performed after the dew has dried off. It is to be recollected, that clover will keep with less drying than almost any other grass. A common test is, to take up a bunch of the hay and twist it, if no juice exudes, the hay may be hauled in with safety—we have often hauled in clover cut in the morning, in the evening, and always the succeeding day, unless prevented by bad weather—sprinkling every layer of hay with salt, at the rate of 12 or 15 lbs. to the ton, or interposing a layer of dry straw, from 6 to 12 inches thick, between every two layers of clover of the same thickness, will be found a great preservative; and especially the latter mode will enable the farmer to put up the hay in a far greener state, than could otherwise be done with safety. Besides this advantage, the straw interposed between the layers of the hay, by absorbing its juices, will be rendered much more valuable as provender, and if salt be sprinkled on the hay, will be greedily consumed both by cattle and horses. From the great quantity of this grass produced on an acre, its highly nutritive quality, the ease with which it is cut and cured, farmers will find, that clover hay is the cheapest food on which they can keep their stock in good order during the winter. If put up in good order in the fall, sheltered from bad weather, and salted, both horses and cattle will keep fat on it alone throughout the winter, without the aid of grain, unless when worked.

The prevalent notion, of the difficulty of curing clover hay, is entirely erroneous. In a climate like ours, there will seldom be found any, in a wet and cool climate, like that of England, the difficulty may exist to some extent, as clover when put in cocks will not resist rain as well as timothy and some other grasses; but in the course of fifteen years' experience, we have seldom lost any, or had it much injured by the weather, indeed we have found it incomparably easier to save clover hay than corn blades, and as three or four tons of the former, with the aid of plaster, can be made at less expense than one ton of the latter, the farmer must be blind indeed to his own interest, who does not take care to provide himself with at least as much clover, as will furnish an abundant supply of provender for his stock.

Clover should be cut for hay when about one half the heads have become of a brown color. If cut earlier, it is believed the hay will not be so nutritious; if later, the stems will have become harder, and the grass be on the decline. For hogs however, and young stock, it will be advisable to cut some so soon as it is in full bloom: when cut in this state and salted, hogs are very fond of it, and it is believed might be chiefly wintered on it, if otherwise carefully protected from inclement weather. At all events, by the use of it as a food for hogs in part, a great saving of corn may be effected.

When the farmer can do it, he will find a great advantage in providing himself with long, narrow, and high sheds, open at least on the south side for the preservation of his clover hay, and when hauling it in, to begin at one end, and spread a layer of hay along the whole length of the shed, and then repeat the same process; by this means, he will be able to put up his hay, in a much greener state than could safely be done, if put either in a stack or mow, and as yet there are but few persons in this country sufficiently expert in the art, to stack it so as to ensure its preservation. In narrow sheds, one load is considerably dried before another is thrown on it, and when the sheds are filled, the narrowness of the bulk being so much greater, there is far less danger of injury to the hay by heating. We again solicit as a favor, from our readers, that they will make full and fair experiments of the mode recommended in the following article, and that they will furnish us with an accurate account of the result; by so doing, they will not only confer a favor on us, but discharge a duty which they owe to the public, for whose benefit it is desired.

From the Cultivator.

MAKING CLOVER HAY, IN COCKS.

Nothing is so hard to combat as the prejudice of farmers, who think they *can learn nothing* in their business. We have often recommended curing clover hay in cocks, as a means of doubling the value of this kind of hay, besides lessening the expense of curing it. Many good farmers and intelligent men, have ridiculed the process, because it run counter to their practice, and was what they could not reconcile to their idea of good management. But they would never make the trial; if they had done so, they would have seen that they were wrong, and we right. We beg leave here to say, that in many districts of Great Britain, spreading hay from the swath, or tedding it, is going wholly out of practice, as causing unnecessary labor, and as diminishing the value of the hay. But there they are not blessed with our ordinary sunshine and heat in the haying season. The hay curing process, with them is a business of some days, on account of their comparatively cool climate and humid atmosphere. But with us, when the grass is matured, and thin, and the weather good, it is often the business of a day. But this cannot be the case with us with early-mown hay, particularly where clover abounds. The grass is then full of juices, and the succulent stalks of the clover require time, as well as sunshine to part with their moisture. Spread and exposed to a hot sun, the leaves, blossoms, and exteriors of the stems soon dry, but in drying, the exteriors of the stems become indurated, and refuse, like wood painted when green, to part with the interior moisture. The consequence is, the grass must either be housed in this half-cured condition, and spoil in the mow, or, if the curing process is completed, so as to prevent damage, the leaves and blossoms, which constitute the best parts of the hay, are over dried, crumble and are lost. Cured in cock, every part of the grass whether the leaves or the thick stalks, dries alike. and is alike preserved, and the evaporation of moisture goes on, I believe, even in wet weather; for a partial, though in no wise a prejudicial fermentation takes place, and the rarified air which it generates, being specifically lighter than the atmosphere, is constantly passing off.

We have been induced to these remarks, at this untimely season, in consequence of finding in the Farmer and Gardener, an agricultural paper published at Baltimore, a communication from John Smith, fully confirming the utility of our recommendation and long practice. It would seem that Mr. Smith was led to make the experiment rather from necessity than from choice. But we will let him tell his own story.

"It will perhaps be recollected," he says, "by all attentive agricultural readers of that paper [the American Farmer] that it was recommended to farmers to put their hay, in its green state, or as soon as cut, into small cocks, and cure it by sweating.

"When I commenced cutting my clover hay the present season, the prospect for favorable weather was flattering, but in a short time it changed, and it became evident we should have a wet spell. I then dropped the scythes and put all hands to putting up the grass (then perfectly green, but exempt from external wet) into cocks of about 200 lbs. cured hay, building them compact and high, to avoid the introduction of rain as much as possible. Rain came on before I secured all the cut grass, but the next day was fair, and I succeeded, by unremitted attention in getting the water dried out of the remainder, and put it up in the same way. It continued rainy ten days, and afforded no opportunity to cure in the sun; the cocks were examined daily, by running the hand and arm into them, and, contrary to all expectation, gave no indications of fermentation. At the end of ten days the weather became fair, the cocks were opened and found to be in a perfectly sound condition, except so far as the rain had penetrated, and the external wetting alone, in my opinion, made it necessary to open it at all. Tell farmers they need not fear losing their hay on account of unfavorable weather at harvest. I have never seen worse weather in hay harvest, and I saved mine entirely well. It is most excellent hay."

Our practice has been, except in cases of necessity, like the one above, to let our hay wilt in swath, that is, to cock in the afternoon that which is cut in the forenoon, and to have the cocks not to exceed fifty to seventy lbs. hay when cured. We are glad to see that a larger quantity will cure well. Let it be remembered that the cocks must not be made by rolling, but by placing, with a fork, one layer above another, till the cock is completed.

From the Genesee Farmer

BURYING BEES.

Mr. Tucker—It is two years this spring, since I first commenced bee-keeping. In the outset, I had no knowledge whatever of their management, and it was a stipulation of the bargain with the person of whom I obtained them, that he should, as occasion required, impart to me such facts as his experience would justify, in regard to their culture. This agreement was satisfactorily performed; and, aided by the information thus received, my success, for a tyro's, was such as to create an almost enthusiastic interest in this branch of rural industry.

In the autumn of 1833, I selected four hives, (double the number with which I commenced,) for wintering. Three of these had so limited a supply of honey, that I was advised to bury them, an operation which, in my mind, was little preferable to throwing them away. But I concluded to "try the experiment," and on one of the last days of November, they were "deposited beneath the little mound," where my mind figured them as possessing the interminable repose of "their last resting place." My absence on "the return of spring," that season when dying worms are wooed again to life, and the faded wing of the insect receives new colorings, beautifully wrought, from nature's dye, prevented me the pleasure of witnessing their exhumation, but the person who took them from their temporary sepulchre, (which was done about the 20th of March,) informed me that on their first introduction to the air and light, their animation was as perfect as that usually exhibited by bees in June. He said that he did not find half a gill of dead bees in all the hives. These hives gave swarms earlier and more frequently than the one that remained above ground, during the ensuing summer.

Last fall I concluded to continue "the experiment" with a single hive. The one selected was very light, probably note containing a sufficiency of honey to carry them half through the winter, had they been kept the usual way. In consequence of a rainy season through the last of November, they were not inhumed until December, probably as late as the 10th. They were occasionally fed in the fall, lest their supply should not be sufficient to insure a subterranean existence. My faith was as wavering when these last were buried, as on the previous winter, and as often as looked at the spot where they were interred, I viewed it as the grave of my little insect friends.

They were taken up on the 28th of March, and much to my satisfaction, I found that the second experiment had terminated with the same happy results as the first. Not two dozen were lost, and new comb was actually formed while they were in their "dark abode."

My "modus operandi" is as follows. A hole is dug considerably larger than the hive, or hives, in every respect. On the bottom of the whole two sticks of three or four inches in diameter are placed for each hive, and on these the floor board, which should be a sound one, is placed. Another board, (two inch plank is preferable,) is put on the hive, and dry straw is as compactly as is convenient placed around it. This, in rainy weather, if the ground is clear from frost, allows the rain to pass freely down, while the space between the blocks furnish a ready reservoir from which it is absorbed by the earth, without offering any injurious effects to the bees. The earth is placed upon the hive in a conical form to turn the water from the hives, the top of which are about four inches below the surface. With respect to the experiment of 1833–4, I cannot say whether the apertures of the hives were closed, but in that of 1834–5, they were not. This experiment succeeded, but whether it is the best way of proceeding I shall not advise.

I regret that I did not weigh my hives, in both instances, previous to burying and on disinterring them, that the amount of food consumed might have been ascertained. But my experiments were both of them faithlessly tried, and unnecessary ceremonies were dispensed with. The quantity of honey consumed, however, was small, as none but very light hives were selected, and their weight in the spring was apparently nearly as great as in the fall. It is my intention in future experiments to mark items more particularly.

In selecting the spot for burying, a dry, and cold, rather than a warm one should be chosen. An individual of my acquaintance buried on the south side of a dry hill. and an entire loss of all thus treated was the consequence. I attributed it, (though perhaps some other defect was the cause,) to such situations being more exposed to frequent freezings and thawings, the insects are subject to more frequent change of temperature, a circumstance injurious to all that comes within its influence. If the situation is such as that the ground will freeze immediately after the trust is committed to it, and remain so until time to "remove the deposites," to me it would appear most favorable.

Yours, etc.

WILLIAM BACON.

Richmond, (*Ms.*) *April* 23, 1835.

From the Richmond Enquirer.

HAIL STORM.

We have accounts of a hail storm, on Monday last, which continued from five o'clock in the evening, to eleven at night; from Fluvanna to Charles City. It came on early in the evening, in Goochland; and its effects in the neighborhood of Dover, on both sides of the river, were most distressing. The hail varied from the size of a hen's egg, to the smallest bird's egg. Some of the stones measured eleven or twelve inches in circumference. On some farms, it has done great injury to the wheat, (already a very short crop,) corn, clover, &c. The damage on one farm is estimated at 5 or 6,000 dollars. We have heard of one farm in Charles City, where the wheat has suffered from the hail which fell in the night.

Extract of a letter from Goochland, dated June 3d, 1835.

"I rode up yesterday to witness the terrible devastation produced on Mr. Sampson's farm, by the hail storm on Monday night. It was distressing to witness it. The finest crops of wheat, corn, oats and clover, perhaps, on James River, totally destroyed. The greatest power of the storm fell on his low grounds, and such was its force, that, I assure you in riding through his wheat field of 60 acres in Sabot Island, I counted from one end to the other, but twelve heads of wheat standing. It was not beaten down, but literally mowed, leaving strong and smooth stubble, and more neatly harvested than I have ever seen a field. Mr. Sampson calculated on a yield from the field of 25 or 30 bushels to the acre. If there are 30 heads standing on the whole 60 acres, it is as much. Mr. Scott, of Manakin Town, who was with us in our ride, stated his and the crop of Mr. Beverly Randolph, to be nearly in the same condition. We, thank Heaven! escaped, but I dread to hear from the tobacco country west of us."

☞ We have not learned the extent of the storm, but we are informed by a stage passenger, that six miles above Wilmington, the hail stones measured nine inches in circumference. Pigs of good size—and many turkeys were destroyed—and, indeed, almost every thing that came in its range.

HAMMERING BY STEAM.

There is no pause, no stop to the inventive genius of our countrymen. A physician of Boston has invented a machine, consisting of numerous hammers which go by steam, the force and rapidity of which will enable the owners of the rich granite quarries of Massachusetts and New Hampshire, to dress and face blocks of this hard rock for building in a very short time, and at a cheap rate. This had been a serious difficulty, and it is now overcome.

From the Boston Transcript.

ICE AND ICE HOUSES.

It is quite warm enough at this present writing to discourse of ice, but whether it will be when the types are giving publicity to the labors of the pen, depends entirely upon the future, which may be noted as a very wise remark. We intend, however, to say a few words of ice and ice houses, that may interest the reader. There are persons younger than ourself who can remember when the only ice sold in Boston, was brought to the city in parcels of ten or fifteen pounds in the box of a market gardener's cart, and sold as a very great luxury at a corresponding price. There were then no ice houses in the vicinity, except a few gentlemen's country seats, and they were built under ground, and were of small capacity. Within the last twenty years the consumption has become so general, and the cost is so small, that ice is no longer deemed a luxury, but one of the necessaries of life. The amount exported also from Boston to southern climates is incredible. The art of preserving the ice is very simple, and in well constructed houses, there is scarcely any loss from dissolution, and it may be preserved for years. We rode out last winter, with Col. Metcalf, of Cambridge, to witness the process of filling one of his ice houses, on the borders of Mystic Pond in Medford, about six miles from the city. The ice house is built entirely above the ground, as is now the well approved custom, even in *tropical* climates. It is 85 feet long, 50 feet wide, and 25 feet posts, and holds nearly 3000 tons of ice. The house is built of pine boards, and the ice is protected from external heat by filling in the walls, which are a foot and a half thick, with the exhausted bark of tan pits—a non-conducter of caloric that has been found perfectly efficacious. The Mystic Pond ice house is very happily located, being so situated that the ice may be discharged directly from the house into the boats of the Middlesex Canal, or the cars of the Lowell Rail Road, and can therefore be brought to the city at much less expense and loss by waste, than from any other establishment. The pond itself is supplied with water from another pond just above it, which upper pond is fed by such abundant springs, that we are told it never freezes in the coldest season. The water, therefore, is of the purest and most limpid quality. Col. Metcalf has lately loaded with this ice a vessel for Rio Janeiro, and another for Bombay. He has also sent freights to Norfolk, Savannah, and other southern ports. It is transported on the canal, and hoisted on board the vessel by machinery, made for the purpose, with great facility.

The process of cutting the ice, getting it from the water, and storing it in the ice house, is ingenious, but simple. The ice house is built on the border of the pond, and one end projects over the water. At this end there are two openings or doors, which extend from the floor to the roof. When the ice has made to a sufficient thickness, say 15 inches, a spot is selected where it is of the purest, most transparent, and solid quality. It is then marked out into oblong squares, 21 inches wide by 3½ feet long. At every 21 inches of width, a groove is ploughed, half an inch wide, and four or five inches deep, by a plough made for the purpose, and drawn by a horse; the ice is then sawed across, at distances of 21 inches, and one series of blocks being removed, the rest is easily set loose by a staff with a broad, chisel-formed end, driven into the groove, and used as a lever. A canal of a corresponding width to the blocks, is then made from the place where the ice is selected, to the house, and the blocks are pushed along with a staff to one of the doors, where it is received into an iron cradle and hoisted up to the requisite height, when a spring, which has prevented the block from falling off, strikes a projection and being forced down, the ice slides into the house, and is there received by persons who push it into its place with a staff. From the commencement of the process to the end, the ice is never touched with the hands. The average weight of each block is about 400 pounds, and being all cut of the same form and proportions, they are packed much more closely in the ice house, or in the hold of a vessel, than when cut out as formerly, with an axe, in a negligent manner.

Extract from the Genesee Farmer.

FERTILIZING PROPERTIES OF LIME.

When the writer of this article went, in the days of his boyhood, to reside in one of the southern counties of Pennsylvania, the land upon which he lived had been purchased at the common price in the neighborhood, £4 Pennsylvania currency, per acre. A short distance to the north-west lay the great limestone valley, that extends, with some abrupt terminations, from New York to Virginia. The serpentine ridge which bounds this valley on the south-east, was considered by the inhabitants as the limits of the grain country; and although the land adjoining it south-eastward was a good sandy loam, it was thought that it would produce nothing but grass, and the land in the valley was then estimated at an average price of £15, or $40 per acre. In a few years, however, the farmers began to haul lime from the valley, and make liberal applications of it on the land south of the ridge. They have continued this process with increasing industry for forty years, with increasing success, and the consequence has been that the valley, which was thought abundantly calcareous without the application of lime, has remained stationary in value, with some fluctuations during the late war, while the land upon which lime has been liberally applied, has advanced from £4 to 80 and $100 per acre, and from the abundance of its crops fully justifies the purchaser.

From the Cultivator.

THE OSIER WILLOW.

The osier willow is worthy a place on every farm, because it takes up but little ground, requires very little care, and furnishes the best materials for baskets, which are indispensable to the farmer. This, like all the willows, is readily propagated by cuttings. Where it has taken good root, its shoots in good ground, grow from four to eight feet in a season. These shoots should be taken off every winter, unless very large willows are wanted, and the number is thereby annually increased. The art of fabricating baskets from them is easily acquired, and may be practised in evenings and stormy days in the winter without cost. For ordinary baskets the osier is used with the bark on; but for neat house baskets they are peeled. The best way to divest them of the bark, is to cut, sort and tie the osiers in small bundles, say early in March, and place the bundles in a pool of stagnant water: and at the season the leaf buds are bursting, the bark will readily strip off.

The osiers may then be laid up to be used when leisure will permit. A well made osier basket is worth three or four made of splits. We have them which have been in wear for years, and are yet good. To give them firmness and durability a good rim and ribs, of oak, hickory or other substantial wood, are necessary.

From the Journal of Commerce.

TEMPERANCE ON RAIL ROADS.

In building the three rail roads from Boston to Providence, Worcester, and Lowell, total abstinence has been the rule with regard to the use of ardent spirits; and it is now the rule for all those who manage the engines and cars on the roads. In building the roads some of the contractors from the first refused to furnish their men with spirit, or permit them to bring it on the ground. It was soon perceived that those contractors avoided all difficulty with their men; that their men did more work; and that although most of the laborers were Irish, the territories of the temperance contractors were so much more comfortable, that they were most popular, and could always select the best hands. The board of directors became so fully convinced of the advantages of temperance, that they made it a condition with the contractors that they should give the men no intoxicating liquor. Coffee and tea were substituted, and cold water.

On all these roads perfect order and decorum have been preserved. Not even the *civil* authorities have been called on to preserve the peace. On other roads where the same description of laborers have been employed there have been repeated murders, endless fights, often with deadly weapons, and the whole territory around has been rendered insecure. The civil authorities have been set at defiance. The military forces, after being harassed by marchings and watchings, have been unable to restore order, and nothing short of the potent finger of a Catholic priest held up before the men, has been sufficient to restrain their infuriated passions. We have no doubt that the difference between the peacefulness of the east, and the riots of the south, is to be attributed chiefly to the difference in the use of intoxicating liquor.

COMMENTS ON FARMERS' REGISTER, No. 10.

To the Editor of the Farmers' Register.

The 10th No. of the Farmer's Register fully sustains the character for utility, so well merited by its predecessors; but it contains many opinions and facts, of which very different views may be taken from such as are presented to us by the writers themselves. Of these I will take the liberty to offer a few, as I have done in regard to the preceding number.

The excellent article on "Dairy Management" although containing many directions applicable to all parts of Virginia where such things as cows, deserving the name of "milch-cows," are kept at all; yet has several that will long—if not forever—prove impracticable for any beneficial purpose.—For instance, the author recommends not only to milk the cows three times a day, but "to have the milk drawn from each cow separately, put into the creaming-pans as soon as milked, without being ever mixed with any other." Now it is quite notorious, that if this were attempted, especially during three parts of the year, on ninety-nine out of an hundred farms, there would be a necessity for substituting small saucers, or vessels of similar size, for "creaming-pans"—each to be carried several hundred yards from the cow-pen to the place of deposite, which is always remote. This transportation, if the cows were numerous, would require several hands to perform it; besides, the nearly nominal milk-woman, whose title, like the definition of the "*lucus a non lucendo*," generally means something almost the opposite of what it would seem to mean. Such a process, to say the least of it, would cost more than it was worth, not to mention the danger that the contents of each creaming-saucer would entirely evaporate before a sufficient quantity could be obtained to make a separate churning—even in a bottle. There is one hint however, that would be particularly useful, and exactly in proportion to the scarcity of milk. It is to let the calves suck *first*, which is no where practised among us. This would leave the richest part of the miserable pittance for ourselves, instead of leaving it, according to the constant practice, for the calf, who is thus treated better than its owner, while its poor dam is often suffered to die of starvation.

Query: Are we to understand your short note on the "locust," as pronouncing the "honey locust" an exotic? I had always deemed it indigenous.*

W. C. Dwight's letter to the Genesee Farmer relative to Hussey's machine for harvesting wheat, is a very interesting communication, and some further information as to the cost, and means of procuring it, would be very acceptable, I should think, to all your subscribers who cultivate wheat.

The history of the horse is a very entertaining as well as useful article; and may, if properly studied, obtain for that highly serviceable animal better treatment than he too often receives from his ignorant and cruel master, who first wears him out for his own pleasure and emolument, and then leaves him to starve to death.

"A Seeker of Light" has asked two stumping questions. The first in regard to "the most effectual and shortest method of restoring to fertility worn, galled, and gullied land;" and the second, to have stated "in specific inches," what may properly be called deep ploughing. Presuming that he would wish to adopt the most economical as well as the quickest and most efficient method, I would say, that the best farmers, with whose opinions I am acquainted, recommend deep ploughing of the arable parts, filling the gullies with small green brush, to be well covered with the adjacent earth, and applying to the surface the freshest and the strongest manure to be procured on the farm.

"Deep ploughing," (as the querist himself says,) is "a comparative term"—consequently, what would be deep in one soil would be shallow in another. A specification "in inches" therefore, cannot be made, unless he will first specify the exact depth of the particular soil wherein he wishes to know what would be called deep ploughing. It may however, be stated as a general rule, that to plough twice as deep as the natural soil, which is very rarely more than two or three inches in eastern Virginia, is deep enough for the purposes of improvement. Even this should depend upon the nature of the substratum; for if *that* be sand, as it very often is, it should never be brought to the surface. Again: in the attempt to plough deep, special care should be taken to lap the furrow-slices, like shingling, and not to turn them completely upside down, which would bring a *caput mortuum* to the top, incapable, for a long time, of producing any thing. Earl Stimson, one of the most celebrated and successful farmers in New York, and one who obtained some years ago, a premium for the best cultivated and most productive farm in the whole state, ploughs only three inches deep, according to his own statement. But all that has been, or can be said of particular modes of culture and depths of ploughing, both require to be somewhat varied according to the peculiar circumstances of each farm. One practice only will be found, I think, applicable to all, and that is, never to plough more than as deep again as the natural soil, but to loosen the earth as deep as practicable with a single coulter, run in the bottom of each furrow, which makes no change in the relative position of the different strata, but vastly augments the capacity of the earth so treated, for attracting and retaining moisture. This is manifested in a striking degree during drought, by coultered corn retaining its verdure much longer than that which had received only shallow cultivation—of which I have seen numerous instances. The practice is, to run the coulter in the bottom of the first furrow thrown from the corn, soon after it comes up, and immediately before the earth is thrown back; then to run it in the bottom of the two next furrows also before they are thrown to the first. This loosens the whole to the depth of some eight, nine, or ten inches, and effectually prevents the soil from baking, at the same time that it secures a soft bed for the young roots to spread in every direction.

On the tobacco article I have very little to add to the numerous, and, (as I think,) unanswerable objections of the writer to its culture. Of this I know scarcely any thing, having never either made or used any. All I will venture to offer in addition to G's very judicious remarks, is a short article from that quaint old fellow, Burton, who, in his most curious work, "The Anatomy of Melancholy," published more than two centuries ago, speaks of tobacco in the following terms:

"Tobacco—divine, rare, superexcellent tobacco, which goes farre beyond their panaceas, potable gold, and philosopher's stones; a soveraigne remedy to all diseases. A good vomit, I confesse; a vertuous herbe, if it be well qualified, opportunely taken and medicinally used; but as it is commonly abused by most men, which take it as tinkers do ale, 'tis a plague—a mischiefe—a violent purger of goods, *lands*, health; hellish, devilish,

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*We stand corrected in this matter. Ed. Farm. Reg.

and damned tobacco—the ruine and overthrow of body and soule!"

If "I. E. T." will take the trouble to visit any of the gardens in the city of Washington, especially that of Mr. Jesse Brown, the worthy landlord and proprietor of the excellent hotel which bears his name, he will learn a thing or two about the culture of celery that will cause him to change his method entirely, unless he happens to be one of those gentlemen, who, if they can say of any thing—"this is *my* method," will not so much as listen to any other.

The kind of corn recommended by William Carmichael, on Wye, Eastern Shore of Maryland, is evidently the kind lately called "twin-corn" in that state. What he says of Mr. Edward Lloyd's opinion of it makes me *sure* that it is the same.

I agree perfectly with "A Radical" from Norfolk county, as to the fence law; but beg him, and all who think with us on this subject, to bear constantly in mind the old adage, "what can't be cured must be endured." If he can suggest any sure method to rid ourselves of that pestilence, demagogueism, we shall soon get rid of the fence-law grievance; but until then, I deem our case utterly hopeless.

With due deference to Dr. Prout and Professor Autenrieth, I must believe that the new plan of the latter for making bread out of wood! will never be available in any country where either wheat, rye, oats, or Indian corn can be made.—Even on the score of economy, I should say, that our old fashioned bread was the cheapest, to say nothing of the difficulty we Virginians should have in training our grinders to masticate, and our stomachs to digest wooden bread. "Wooden nutmegs" perhaps, has suggested the idea to the learned professor—if indeed he has ever heard of this ingenious American invention. But to make bread of the same article would be carrying the matter rather too far, in any other region than Lapland.

Your correspondent "T. B. A." has drawn a most wo-begone picture of the farming in Virginia on land naturally poor, or, as I have heard it called *"born poor."* Of this kind there are thousands of acres in his country—poor enough, as I was once told an Irishman said of certain hills in Stafford, "to make a rat cry." Bad however, as his picture is, I verily believe that it is literally true, and furnishes a case past remedy, unless by the application, which you suggest, of calcareous manures. But these are attainable only by a comparatively small portion of the owners of such lands. To let them grow up in wood seems to be the only good use to which they could be applied, as their profitable culture is out of the question.

There is one part of his letter where he appears (if he will pardon me for saying so,) less at home. It is the paragraph wherein he propounds a question or two on certain topics of political economy. Had he consulted the most approved writers on this subject, or statistical comparisons of the two methods of conducting internal improvements, by private chartered companies, or entirely on state account; or had he availed himself of notorious facts within our own country, applicable to this subject, I cannot believe that his opinion would have been what here appears. It is well known, for instance, that one of our sister states has tried the latter plan until she has involved herself in a debt of some fifteen or twenty millions of dollars, for works, many of which have been made political party jobs—given of course to incompetent undertakers and superintendents; undertaken sometimes where none should have been attempted; and carried on at an expense far exceeding any that a private company or companies ever would have suffered to be incurred. *They* never, or very rarely indeed, make turnpikes, rail roads, and canals, unless upon the strongest presumptive evidence that they will be profitable to themselves, and of course, advantageous to the public; for the two things, like cause and effect, are inseparable. On the other hand, in a country like ours, which is destined, I fear, to be forever governed by political party under one designation or another, almost all matters of internal improvement when undertaken on public account, are forced to subserve, in locality, in the choice of agents to conduct them, and in the expenditures lavished on them, the popularity of the occupants for the time being, of political power.

One of your own remarks upon T. B. A's. communication furnishes, I think, a strong argument against your apparent preference of the four-shift system to the three-shift system. You call the former "milder;" although you stated that in a certain trial of it for nearly twenty years, "there has been *an actual and considerable lessening of the product.*" 'Tis true you say, "this diminution is supposed to have been caused by the ploughing having been too deep (six inches) for so shallow a soil." But if it was too deep at first, would not the injury have been curing in the frequent reversal of such ploughing during the period mentioned? Query: have the two systems ever been fairly tested and compared by the same persons, on the same soils? All the statements which I have seen, have been *ex parte;* they have been made by the four-shift advocates, and have generally reminded me of a tale told upon a certain jocular merchant of the olden time, who tried to persuade a half-witted customer, that his, (the merchant's) fist weighed exactly *a pound.* The fist of the four-shift advocate has always been thrust into the scale that he evidently wished should preponderate. To try both systems properly, each should exclude grazing; the small-grain fields should be clovered in both, and the manure made on each farm applied in the same manner—say, on the corn land in each. Although the comparisons which I myself have made, have not been sufficiently numerous and accurate to satisfy myself which system is best, yet they have convinced me that the three-shift plan, if pursued in the best practicable manner, possesses two or three advantages which nothing in the four-shift system has counterbalanced—at least in any case that has fallen under my observation. I deem myself an impartial judge, because I really have not "committed myself" (as the politicians say,) on either side. These advantages are, that one-third instead of one-fourth of the land is always producing a grain crop; that the clover turned in for improvement is much more pure, and freer from perennial and noxious weeds, such as St. John's wort, camomile, daisy, blue thistle, and that worst of all pests the prickly nightshade; and that consequently, the three-shift system will produce *probably* as much corn, and *certainly* much more wheat than the four-shift; wherein I have known this latter crop often nearly destroyed by some one or more of the pestiferous plants just mentioned, to say nothing of the far greater increase of insects injurious both to corn and wheat. The farm on which our Trismegistus Col. John Taylor, of Caroline lived, and on which he pursued the four-shift system, was excessively annoyed before his death by these nuisances. But when I first knew it, some forty odd years ago, then under the three-shift plan in its worst form, and before he owned it, not a thing of the kind was to be seen. Several gentlemen who have followed the rival system have often complained to me of the constant diminution of their wheat crops. Of this, there was *no doubt*; but whether to ascribe it to the redundant accumulation of unrotted vegetable matter; to the greater increase of destructive insects; to the more rapid multiplication of the noxious weeds already enumerated, to which I might have added the still more formidable enemies—running-brier, trumpet flower, yellow locust, sassafras, and persimmon, they did not undertake to assert. Now, if the four-shift advocates, *versus* three-shift advocates, admit the foregoing facts, which can be established beyond cavil or refutation, let the non-committed farmers and planters decide between them. How this controversy originated, seems to me of no importance; but its continuation surely need not be long, if only a few reputable farmers would undertake to try the rival systems fairly. The friends of each have taken for granted *that* which both Flemish and Chinese husbandry, 'tis said, have proved to be untrue. This is the necessity for resting land—in other words, leaving it uncultivated for some years. Both in Flanders and China, unless my information be incorrect, all arable land is made to bear some crop every year, and its fertility is at least preserved, if not increased, by the application of manures and a proper rotation of crops. Why might it not be so in Virginia?*

The article on draught from the "Library of Useful Knowledge" is an excellent one, and should be diligently studied by every person who owns either a plough or a carriage of any kind, since the principles on which they ought to be constructed in order to render them as perfect as practicable, are probably as little understood as any other art can be, which is of such great importance to mankind.

"A" has presented some very useful hints on the management of sheep, which in most parts of Virginia are worse treated than any other other stock, although as profitable, perhaps more so, in proportion to first cost, than any other. In summer they are rarely noticed, except to shear, or to furnish a lamb for the table; and in winter, too often left to shift entirely for themselves.

COMMENTATOR.

*The "four-shift" rotation referred to above is that recommended by Arator, of corn, wheat, and two years' rest, either with or without clover—and not the very different rotation called also "four-shift" of three grain crops with clover fallow. Each system has its peculiar disadvantages, (which we do not mean to discuss here—) but the latter "four-shift rotation" is truly such as "Commentator" advocates on the authority of Chinese and Flemish practice. There is *no year or season of rest*—but the fourth crop (clover) is turned in as part of the manure necessary to bring three grain crops in succession. As to Arator's four-shift rotation, of which we have had long experience, however beneficial for restoring lost fertility to poor lands, it is certainly liable to the objections stated above, of encouraging the increase of troublesome weeds, and destructive insects—of both which evils we have had woful experience. As to the causes of diminished production in our experiment of this rotation, referred to above, we can throw no additional light on the remarkable results. Ed. Farm. Reg.

COMMENTS ON FARMERS' REGISTER—No. 11.

To the Editor of the Farmers' Register.

Mr. C. W. Gooch's two letters contain much interesting and valuable matter. It is therefore to be regretted that he should have blended with it any thing as a settled truth or principle, which is still a subject of controversy among some of the best writers, both in this country and in Europe. Such are his assumptions as to the cause of "Malaria," and the best state in which to cut grass for hay, which he says, is *"in full bloom."* Without expressing any opinion myself on either topic, I will here only remark, that it cannot probably be unknown to Mr. Gooch, that numerous well written treatises have been published within a few years past, on the causes of malaria, maintaining not only different, but contradictory opinions, and that the subject may truly be said to be *"adhuc sub judice"*—yet undecided. Again, it is quite improbable that Mr. G. should be ignorant of the statement made by Sir Humphry Davy in his Agricultural Chemistry, of the ninety-seven experiments made by the Duke of Bedford's gardener, at Woburn Abbey, for the purpose of ascertaining at what particular stage of growth it was most advantageous to cut the different kind of grasses subjected to these experiments. The number of grasses subjected to trial was ninety-seven, and in most of the cases, as well as I recollect, the quantity of nutritive matter ascertained by accurate analysis, to be contained in the grass cut when the seed was ripe, exceeded the quantity in it when in flower, to an enormous extent. Quere, does Mr. G. use the term "grass-knife" as synonymous with grass-scythe, or is it a new implement?*

His suggestion to mix two kinds of grass-seed together, is probably a very good one, and might be extended to the mixture of three or four, if we may believe some late English publications on artificial grasses.

The description which he gives of what his neighbors have called "blue-grass," renders it

*The term was meant for the scythe, it is presumed, as it is often so applied in this part of Virginia.—Ed.

highly probable that it will prove very valuable in lands similar to those on the Chickahomony, although it is to be regretted that a different name had not been bestowed on it, since we already have a highland grass by the same name, and of quite a different character. If this new grass "will conquer the bull-rush," it will accomplish more than any other species has ever yet done among the various trials I have seen made. Effectual draining however, most certainly kills it.

As to two other pests which he mentions, the running brier and the sassafras, I have had woful experience of both, but have not succeeded in extirpating either, although his mode for destroying the latter is certainly worth trying.

The method of sowing grass seed recommended by Mr. G. is by hand. This I know is the customary mode; but not comparable to that by a machine made and sold by Sinclair and Moore of Baltimore. This is so constructed as to sow any kind of small seed, or small grain, broadcast, in spaces twelve feet wide, and as fast as a horse can walk. Small tin slides, perforated with holes of different sizes, regulate not only the quantity of seed distributed by each step of the horse, but also enable the sower to change the kinds when he pleases, merely by moving the slides backwards or forwards. It is likewise admirably adapted to sowing gypsum. The cost I believe is about 60 dollars; the construction simple; and the durability probably great. In level open land, I have never seen any method of sowing small grain, grass seed, or plaster, that seemed to be comparable to sowing them by this machine.

From Mr. G's remarks on what he calls "*the guinea grass*," I should infer that he means a species of millet which I have heard so called, but improperly. This inference I draw from the fact that Mr. G's opinion is in direct contradiction to that of the only farmer of my acquaintance who has cultivated the guinea grass to any extent. The gentleman is Mr. John Roane of King William, who has been trying it for some years, and speaks so highly of it both for soiling and hay, that he is now extending its culture. Mr. G's conclusion against "exotic grasses" altogether, because *some* of them have yielded but "one crop of hay," seems neither very logical nor accordant with the experience of many other farmers. It is notorious, for instance, that the lucerne which is an exotic, can be cut four or five times in the season at the average height of fifteen or eighteen inches—and I myself know an instance which occurred last summer, (dry as it was,) of guinea grass being cut four times, at the average height of at least three feet, in each case. Mr. G. inclines to the opinion, once universal in my part of Virginia, and in favor of which more, I think, can be said than the scoffers at it are aware of—I mean the occasional, if not the annual burning of lands which are much covered with dead grass and weeds. Without either denying or affirming it to be correct, I will barely add the admitted facts in its favor. It converts coarse vegetable matter—full of the seeds of weeds and the eggs and larvæ of insects, into the fertilizing substance, ashes, which is free of all these nuisances; and it lessens much the labor of preparing the land for an after crop. To this may be added, as something worthy at least of being well considered, whether certain discarded practices in agriculture have been condemned upon sufficient evidence of their worthlessness. The individuals of each generation are too apt to consider themselves the peculiar "children of light," in comparison with their predecessors, and consequently sometimes discard, as unworthy of their superior knowledge, practices superior, in some respects, to their own. So it *has been*, and I fear *will be*, to the end of time; but those who think so, should still not despair of guarding some against so pernicious a fallacy.

The second letter of your correspondent Mr. Gooch, increases much in value as well as interest, for it has more facts and fewer opinions. Among the former, I find several which furnish in my humble judgement, some very strong proofs in favor of applying manures *in the freshest state*, and *to the surface*, instead of ploughing them under. They also favor, as I think, the opinion, that what we call "*resting land*," is needless, if a proper rotation of crops, and manuring were regularly pursued. There is however, *one* fact—at least stated as such by Mr. G., which I myself, although probably as old a man as he is, and living also in the tide-water portion of Virginia, have never witnessed. I mean that wherein he states that "between the Chickahomony and James River hills, there are portions of land, with a gray and ash colored soil *of nine or ten inches thickness*, resting on a clay foundation." Now, I, as well as Mr. G., have examined most soils—such as may properly be so called, in the tide-water part of Virginia, and I have never seen a single spot of highland, where that which could truly be called *soil*, was *five inches deep*. This difference of opinion however, resolves itself into a question of what is really *soil*? and will be deemed perhaps unimportant by my readers—especially as I accord with Mr. G. in the opinion, that it is very advantageous *gradually* to mix with it a portion of "the red clay foundation," wherever it can be reached, even by trench ploughing.

I regret that Mr. G. has not given us the produce in bushels of potatoes, turnips, and oats which were made in the several experiments which he states; for by this omission he has deprived his statements of fully half their value. In the oat case of more than half. Why should he fear that we would doubt his word in the latter case more than in any other which he states—evidently with a confident expectation of being believed? I believe that I know the gentleman personally, and if all your other correspondents are equally worthy of credence, your paper has none more trustworthy, where facts are concerned.

His experiments with the two twenty-acre fields merit particular attention—especially for the fact furnished by the latter in favor of top-dressing with fresh manure. It is high time that farmers should come to some settled opinion, and adopt some uniform practice in regard to this important process. What a deal of labor, expense, and time, and manure also, would be saved by discarding your costly stercoraries—your short and long muck deposites—as well as all the complicated variety of compost heaps requiring ten or twelve months to form them, and three or four horse ploughs afterwards to turn them under—if it were once satisfactorily ascertained, that the best state to use manure was when freshest; and the most judicious mode of applying it was on the surface. Query—have we not already more experiments and facts in favor of this last opinion than against it?

What Mr. G. has told us of coal ashes trials, is not sufficiently particular; for "*other manures*" having been used after them, we have no proof of the share, (if any,) which the ashes had in fertilizing the land which was treated as he states.

Upon the whole, I think your subscribers have much cause to be pleased with both Mr. Gooch's communications, although he has given us something like half a dozen prophecies at the close of the last, which, I fear, can have very little effect in stimulating to more industry the numerous drones of the present generation—since, upon the most moderate computation, they will require some century or two for their fulfilment. This may discourage rather than excite; for if Virginia cannot thrive until then, her case is hopeless. Look at them, I pray you, sir, and then say whether my fears are well or ill grounded. First, the final "improvement of the Roanoke." Second, the same thing accomplished for "the northern extremity of the great Valley beyond the mountains. Third, "the cis and transmontane region nearest Fredericksburg, having easy access to it." Fourth, "the great central improvement of the James and Roanoke, with its lateral branches, offering the Richmond market to the Ohio country, and East Tennessee." And fifth, though last, not least, "a line of rail roads and steam boats connecting the extreme north with the extreme south of the Union."

Mr. Dupuy's inquiries and suggestions relative to "sheep husbandry," involve questions in political economy of considerable interest to Virginians generally, but particularly to land-owners in the middle of the state. There are very few subjects connected with agriculture, of which we are more ignorant, although during the prevalence of the Merino mania in our last war, there were more discussions, and more pamphlets—to say nothing of newspaper out-pourings, than enough to elicit all the information on the subject that the United States and Europe put together could possibly furnish. Why it should have evaporated, it is no easy matter to say; especially when matters were then carried so far, that not only men's politics, but their patriotism, were measured and graduated by their zeal and efficiency in raising sheep—particularly if they were Merinos.

The article which Mr. Dupuy has noticed in the "Cultivator," must be, I suspect, justly attributable to some remains of the old "Merino mania" in the writer; for if land worth one hundred dollars per acre, can really be more profitably used in raising *sheep*, than in providing food for *men*, it will prove indisputably, that in the arithmetic of such political economists *a sheep* is intrinsically worth more than *a man*. To this, as a universal maxim, I cannot strain my credulity; although (by the way) had I a right to make the exchange, I would require but little, if any boot, between some men of a certain political creed which shall be nameless, and an equal number of good sheep.* But every thing like *badinage* apart, (which with some of your contributors, seems to be deemed a contraband article in so grave a thing as an agricultural journal,) I will state, in compliance with Mr. Dupuy's request, notwithstanding it is apparently confined to "northern friends," some odds and ends of information picked up by myself, on this subject, among the Merino patriots of our last war. *One* of them who had profited largely from the fever, by selling his Merinos to the infected, at enormous prices, assured me that he had never found, after various and long continued trials, any cheaper or more effectual way to secure the health of sheep, so far as that depended upon medicine, than to give them tar with their salt. His method was to pour the former into a long narrow trough, made for the purpose, and then to stir up with it a quantity of fine salt, sufficient nearly to fill the trough. The mixture being inseparable, the tar was always eaten for the sake of the salt, and would last a considerable time without the trouble of renewing. As to their other treatment, the information which I collected from him, as well as many others, may be summed up in the following particulars. That although sheep *will live* without any other food than that which they can find for themselves, provided they have sufficient range to hunt it out, yet that they cannot be made either very good, or very profitable, without strict attention to feeding them well during winter, and the month of March, with corn-fodder or hay: to keeping them dry and clean, under a proper shelter, during all rainy or snowy weather—to separating the ewe lambs from the ram, until the second season after they are yeaned—and to regular salting at least twice a week, all the year round. There are numerous well authenticated facts to prove that sheep thus kept will yield, on an average, about seven pounds of wool each; whereas if they are neglected, as usual, the average will rarely exceed one and a half pounds. In regard to minor points, the majority of good sheep farmers whom I have consulted, recommend that ram lambs should be castrated within a few days after they are yeaned; that they should not be sheared until the second season: that this operation should be performed on them, as well as the older sheep, immediately after the long season in May; that a mixture of tar and fish oil should be smeared on from the end of the nose along down the spine, to the root of the tail: and that the flock should be kept rather in highland than lowland pasture, but occasionally changed from one field to another, and penned only in dry weather, during the months of May, June, September, and October.

There are some few of Mr. Dupuy's inquiries that I cannot answer, but hope that some other person will.

Mr. J. Du Val has given your Matthews correspondent with the queer name, a very proper rebuke for violating, as he seems to have done, his own advice, and in the very letter too, containing that advice. I agree perfectly with Mr. Du Val

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*Our editorial pen was in hand to mark out this passage, as touching upon the forbidden subject of party politics. But it escaped erasure upon the ground that each reader would agree to its truth as to the party to which he is himself opposed—and that thus, by rare luck, an opinion might be expressed in which all parties could concur.—Ed.

and yourself, that it is best in general, for every writer to sign his own proper name; but there are two obstacles very hard to overcome, real diffidence, and false modesty, which is but another name for pride. Which of the two operates upon myself, I must leave it to others to infer from what I have already written, if they cannot hit upon some better motive. However, should the spirit move me hereafter to continue my communications, I mean at some future day, seriously to repent of former anonymous scribblings, and to give you, as well as all others whom it may concern, my proper appellative.

W. G's remarks "on harvesting corn," will guard all rash experimentalists from adopting the process recommended by Mr. Buel and Mr. Coleman. In their climate, where the dwarf and flinty varieties of corn are the only kinds cultivated, and where they have plenty of hay for their stock, the method may answer. But in a large portion of Virginia, wherein corn is a very important staple, consisting almost entirely of those mealy varieties which are comparatively late in ripening, and therefore requiring more sun to fit them for housing; varieties, too, that constitute the chief, in many cases, the sole dependance for supporting our horses, cattle, and sheep by their fodder—the practice of cutting up the entire plant at the season proposed, would render all the fodder nearly worthless, and would cause, (as I myself have seen on several occasions,) much of the grain to become mouldy in the heart.

That stripping the blades and cutting the tops might be beneficially delayed much later than usual, I have no doubt; nor have I any that it would be advantageous to discontinue it altogether, on every farm whereon a sufficiency of hay could be made to support the stock.

The short article "on splitting fire-wood" reminds me of a very important fact communicated to me by a good practical farmer several years ago. He stated it to be his practice, founded on his own experience, as well as that of his father, to saw through the heart of every stick of timber which he used either for gate-posts or the sills of houses. This, he said, caused them to last much longer, and I have often since, seen his assertion verified. Only a few days ago I was walking near two old gate-posts which had stood ten or twelve years in the same spot, and happening to think of the above fact, I examined both. The sap part was sound for some depth from the surface; whereas, the heart, which would certainly have lasted the longest if split, as we see by fence-rails, was so rotten, that I thrust my cane down into it almost to its head. The cause of this I cannot conjecture, unless it be, that the heart containing more pyroligneous acid than the sap, and this acid being confined by the surrounding wood, which soon loses, in the seasoning process, its own portion of this principle of decay in wood, the centre decays first because the acid in it cannot escape.

The remarks of "Agricultor" on yoking oxen, furnish another strong case to be added to the thousands already recorded, all going to prove how very slow all agriculturists are in either seeing, hearing, understanding, or believing that any practice whatever can possibly be better than their own. Common sense would lead us to conclude that whatever older nations than we are, universally or generally do, in any of the arts differently from ourselves, must be at least worth trying: but common self-conceit or sheer laziness says *no*—and hence the snail-like progress of all improvements in husbandry.

Whilst our agricultural societies are offering premiums frequently for things, which to say the least of them, are of very doubtful utility, why could they not proclaim one for the exhibition of a pair of oxen yoked according to the Spanish mode? To this might be advantageously added another for the exhibition of a horse shod after the French and German method, which has been said by very competent judges, to be far preferable to our own.

"A Planter from the Lower James" has given us some useful hints on "wheat-seeding." Permit me to add a few more on the same subject. For opening water-furrows in wet land after the wheat is sown, no single mould-board plough can perform it well without running backwards and forwards, which always makes the furrow so wide as to waste land; whereas, the double mould-board plough made by Sinclair and Moore of Baltimore, opens it of the proper width, and at one stroke, thereby saving half the time. To open water-furrows on high, dry land, which, when done at all, is always performed by a plough of some kind or other often running twice, a preferable plan is to use the single coulter, with two small mould-boards about five inches long by four wide, nailed on the helve some four inches above the lower end. This goes deeper than any single-plough, and makes the narrowest furrow compatible with the object.

For hauling off corn, the best kind of carriage which I have ever seen, is one called "a flat" in some parts of the country. The advantages are, that it carries much more than any cart; that it is loaded by men standing on each side, instead of having one to stand on the cart-wheel, and another on the top of the load; and the wheels being eight inches broad and about three feet high, they rather benefit the wheat by rolling the land, than injure it by cutting the beds, as the cart wheels always do, particularly when the land is wet.

To make these "flats," requires very little mechanical skill. The plat-form, or bottom is made like the bed of a cart-body, but longer and wider. It has neither sides nor end-boards, and is covered with thin, smooth plank or boards, nailed on length-wise. In front there are three strong upright pieces about two by three inches square, and five feet high, inserted in the front sill of the plat-form, and connected by one cross-piece at top, and another about three feet below. A similar frame is fixed behind, but made to take off, while the load is forming. This is done by throwing the corn-stalks—ears and all, cross-wise from the sides—the ears in the middle, and the loaders standing on the ground. The hinder frame is fixed when the load is nearly complete, after which, a rope or common grape-vine is fastened to the centre of the front frame, and passing over the load to the hinder frame, secures the whole. The unloading is much facilitated by placing under and over the load a rope or vine long enough for two or three persons to hold on behind, after the removal of the hinder frame, while the "flat" moves on in an opposite direction. This kind of carriage is also far preferable to a cart or wagon for hauling in wheat from the harvest field.

The wheels are made either by sawing off rollers eight inches thick from the body of a tree, if you can find one large enough, or by fastening together either with large pins, or cross-pieces of iron bolted through, three pieces of timber three feet long, and twelve by eight inches square. To these, when thus fastened, the circular form is afterwards given, and boxes of a suitable size fixed in the centre of the middle piece. A single box to go entirely through each wheel would probably be better. If it can be deemed worth while to lighten the wheels, this may easily be done by striking two circles—one four or five inches from the centre, the other, thirteen or fourteen inches from it, and hollowing out the middle space to a thickness of four or five inches.

To guard wheat against smut, it has been ascertained by very numerous and well attested experiments, that nothing more is necessary than to steep the seed in strong brine, and after taking it out, to mix with it as much quicklime as will adhere to the wet grains. A few hours after this it is fit to sow: but the seedsman must use the precaution to grease his hands occasionally, or the lime will soon make them very sore.

Pray, Mr. Editor, tell me what your correspondent means by "*gripped*" land? Excuse me for asking, and pardon my ignorance; for although somewhat curious in regard to provincialisms, and a great hunter up of such odd things, I have never seen nor heard of the above term before, and can neither guess nor imagine from its usual acceptation, what its figurative meaning can be. This puzzle has prompted me to make another request, which is, that you will exercise your "veto power" against all future provincialisms unaccompanied by proper explanations.*

Mr. D. Chandler's mode of cultivating asparagus is, without doubt, a very good one; but the distance one way, at which he plants, is greater than usual, and therefore more, probably, than enough. It may however, be judicious, where land is scarce, as he makes it produce also a crop of beets the first year. "The proper distance for this vegetable" he says, is to have "the rows two feet apart." Is there not a very needless loss of land in this? I have often seen the roots four or five inches in diameter when grown not more than twelve or fifteen inches each way. Mr. Chandler's article furnishes *another proof* in favor of using "fresh unfermented manure" in preference to any other.

The report in favor of a geological survey of our state, and the act which resulted from it, has brought to my mind a subject which has often excited in it, the most melancholy reflections. No state of the same age, is more in want than ours, of internal improvements of every kind; nor any which is susceptible of a greater number that would pay large profits upon the money invested in them. Yet few, comparatively speaking, have been undertaken, and of these it would not be easy to point out a solitary one which has been managed in the best practical manner. The cause, the most deplorable cause of this failure can readily be found by any Virginian who can summon courage enough to examine impartially, facts that must mortify his state-pride. Such examinations will inevitably lead him to the discovery, that party-spirit and favoritism have constantly been permitted to manage nearly the whole affair, in every case. Instead of invariably employing men to superintend and execute the work, *solely* on account of their talents, knowledge, skill, and experience, all these have been either made secondary considerations, or have been disregarded entirely; and some miserable partyism or other, has *in reality*, although never avowedly, been made the test of qualifications. This has resulted in part, from the circumstance of all our works having been made too much a matter of state concern, from which every body knows it is impossible, in these times, to exclude party-politics, rather than to leave their management entirely to the judgement of the private stock-holders. Ask any member of our legislature for fifteen or twenty years back, I care not who it may be, whether he has, in every case, voted for the best qualified individuals in the whole circle of his acquaintance, to fill the various public appointments in the gift of the legislature; and if he does not reply in the negative I will suffer myself to be called a slanderer of my own state. If it would not be too invidious I could state hundreds of cases to prove the truth of my assertion. But I will forbear, and will add nothing more than a solemn warning to all who are immediately interested in the great James River improvement about to be commenced, not to suffer this destructive curse of party-spirit and favoritism to mar the chances of success, by governing the appointment of the engineers and other agents who must be employed

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* A "Grip" is a small ditch cut across the beds after the wheat is sown, and every other operation has been completed. The grips pass through all the low places in the water-furrows, (or trenches between the beds—as "water-furrow" is a provincialism—) and serve to draw off all the rain-water that would otherwise stand in puddles, and injure the crop.

It would be gaining an important object if our agricultural nomenclature could be made so general and uniform, that there should be no necessity for either using or explaining provincial terms. But under present circumstances, it is difficult to know what would be considered as provincialisms requiring explanations, and what terms are of such extended use that the explanations would be quite unnecessary.

"Grips" are described by another writer at page 106, vol. I. We have before proposed what we think would be the best means of avoiding the difficulties of using provincial terms in agriculture—which is, to collect and publish as full a list as possible of all the provincial agricultural terms used in the United States, with the definitions and the localities stated. If this was done, we suspect that our friend "Commentator" would be surprised to find that several of his own terms were considered by other persons as provincialisms. We should be glad to have his aid (and no one could furnish better,) in preparing materials for such a glossary. Ed.

to conduct it. The company have got a charter which I will venture to say can never be executed without several important amendments; and they have got among their members personal partialities and preferences (very honest ones I have no doubt,) which will interpose serious obstacles to success. Add to this, there are some *local* interests working against them, under the plausible guise of public spirit, and therefore the more likely to injure them. These remarks, I assure you sir, are not designed to discourage, even if I were vain enough to believe I possessed any such power. But my sole motive is, a wish that the great work may succeed; and take my word for it, that I do not speak unadvisedly, nor without some good cause in offering the foregoing cautions.

"American Filberts." If by this term be meant the foreign nut raised in the United States, I assert, from long experience, that they will succeed perfectly well in all the tide-water portion of Virginia—perhaps in every part of the state, and bear abundantly; although the bushes are sometimes killed by an insect that adheres close to the bark of the bodies and limbs, and resembles small, hard scales.

The article from the "New England Farmer" on "clover," is particularly recommended to the consideration of disputants about the three and four-shift systems. If it be "*good economy always to sow clover with small grain, though it is to be ploughed in the same or the next season,*" and we have this writer's authority for it—if moreover, "its value to the next crop cannot be less" (as he also asserts,) "than quadruple" the cost and labor of sowing the seed—then have we a complete answer—at least in my opinion—to the strongest objection to the three-shift system.

The recommendations from "the Cultivator" of "root culture" and "pruning fruit trees" in June and July, deserve particular attention. Without the former, as well as meadows or grass lots, we cannot supply our families with the requisite quantity of milk and butter, unless at a great expense of winter feeding with grain and fodder; nor can we have either beef or pork of our own raising, but at great extra and needless cost. In regard to pruning, the writer has omitted one essential operation, which is, to smear all large wounds over with some one or other of the various compositions recommended by gardeners.

Of Gov. Barbour's address, it is nothing but sheer justice to say, that it calls our attention, in very appropriate and forcible language, to several matters of the deepest interest to every true friend of his country. What could be more patriotic than the establishment of a Professorship of Agriculture at our University? What more mortifying and heart-sickening, than the neglect—nay, the fatuitous reprobation with which it has been treated? What epidemic—what pestilence has ever raged in our country, that has proved more destructive to the bodily health of our citizens, than the "party and political and office-hunting strifes," of which he speaks so feelingly, have proved to their moral health? Among all the evils growing out of this state of things, there is none, I think, greater than the utter neglect, on the part of our legislatures, of the vital interests of agriculture, from the establishment of our union to the present day. They did *once* crawl so far, several years ago, as to appoint a "Committee of Agriculture!" yes, verily, a "Committee of Agriculture!" If any doubt my word, let them search the journals of the House, and they will assuredly find, that this patriotic effort was actually made, and as far as we can judge from the circumstances of the case, with "bona fide" intent, on the part of the performers, that they were actually achieving something which would redound in no small degree, to their own honor, as well as to the benefit of their state. What has been the result? Can a single man be found in our whole state who has even known, or even heard of a solitary act of this committee—unless it be of a negative character, since their establishment? In fact, they have literally done nothing, unless it is to furnish the inexplicable phenomenon of the legislature of a state, whose *predominant interest is agriculture*—a legislature, too, consisting *chiefly of agricultural men*—not only neglecting utterly, *all agricultural interests*, but actually making a mockery of them, by creating a committee to take care of them, which has literally proved a sinecure appointment. God save poor old Virginia! (for nothing else can,) when the maddening business of president-making, for ever kept alive by demagogues and office-hunters, is constantly withholding her citizens from studying and providing for all those vital interests by which she lives, and moves, and has her being!

In your editorial comments on "the recent enactments of the legislature of Virginia, affecting the interests of agriculture," I entirely agree, except in your approval of the conclusion to which the committee of agriculture arrived in regard to the petitions for changing the present fence law. Your own reasoning on the subject is evidently founded on the erroneous supposition, that the petitioners sought "*a sudden and entire change of policy.*"* In this I am perfectly confident you are mistaken, for I myself was one of the signers, and conversed often with many others on the objects of the petition. Not a man—at least in my hearing, ever said a single word in favor of a precipitate repeal. On the contrary, all expressed an opinion similar to yours, that the change which they sought—like all other changes of a general

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*Our words were intended to be applied to the view of the subject *professed* to be taken in the report of the committee of agriculture, which is only applicable to an entire and radical change—and not to the objects of the petitioners. We are well assured, (and would have so said in these remarks, it it had been deemed necessary,) that the object of the advocates of a change was generally such as our correspondent states. Our concurrence in these views, and the decided opposition to the principle and policy of the present law, have been sufficiently expressed. But for a change of any ancient law to be beneficial or permanent, it is necessary that it should be preceded by a decided change of popular opinion. Ed.

and long established practice, should be made "*slowly, but surely.*" The petitioners wished only to abolish the system, and designed—as in all similar cases, to leave the choice of the details, as well as the time and manner of accomplishing their object, to the good sense and judgement of the legislature. But admitting the rejection of the petition to be perfectly right, did the committee determine justly in abstaining from any attempt whatever to amend the law, merely because they deemed it wrong to repeal it altogether? Was there a man in our whole legislative body who could conscientiously say, that the present law is faultless? Nay, can a single person be found in our whole community, by whom the law has been read at all, who will not pronounce it full of most glaring defects—defects too, that might very easily have been remedied, without disturbing its precious principle of taxing enormously the whole agricultural portion of our people for the imaginary benefit of a few owners of comparatively worthless stock? If there be any such man, it has never yet been my lot to meet with him. As to that part of the committee's report which you so truly designate as "miserable and false reasoning," I will not trust myself to speak of it as I think it deserves.

COMMENTATOR.

From the [British] Quarterly Journal of Agriculture.

ANIMALIZED CARBON, A NEW MANURE.

This substance is of French origin, and its manufacture is secured by patent. It was discovered by a French chemist; but that it is a substance easily manufactured may be inferred from the fact of its being shipped free on board for 35s. per ton. Mr. Joseph Owen, of Copenhagen, acquired the knowledge of the manufacture from the patentee in France, and has since established a manufactory on his own account in Copenhagen. His traveller, a Danish gentleman, was the first to introduce this new manure to the notice of the Scottish agriculturists. We have not had an opportunity of seeing a sample of it, but it seems it has been tried last year by Mr. Dalgairns of Ingliston, and Mr. Inches of Cardean, who, we hope, will favor us with their opinion of its efficacy. We understand that the Danish gentleman has disposed of 250 tons of it in the counties of Forfar and Kincardine. Mr. Owen's card gives the following account of its nature, and the mode of using it:

"The chief excellency of this manure is, that it is powerful in its effects, occupies but little room, is easily separated, and conveniently used either by hand or drill; its effects are farther to ensure a rich crop, by gradually ameliorating the soil, and rendering fallowing unnecessary. For wheat, rye, buckwheat, barley, and similar descriptions of corn, about 8 cwt. 1 qr. 16 lbs. is used per acre: it may be either broadcast or drilled in before harrowing. For flax, hemp, beet, potatoes, &c. about $10\frac{1}{2}$ cwt. per acre; and 12 cwt. 2 qrs. 10 lbs. per acre for artificial meadows, different sorts of cabbage, rape, culinary plants, and for refreshing natural meadow land. For plants that are set in rows, a handful is put to each plant; for those which are transplanted, a child follows the planter and throws a very small handful of the manure into each hole, which is immediately covered over with earth; in several places for rape, it is scattered out in rows along the roots of the plant, which the plough covers by forming a new furrow. On meadow land it must be spread out in December or January, when the snow is not on the ground. Generally speaking, it is well to mix the manure with half its quantity of finely sifted earth; but there is no necessity for pursuing this method. On light and warm soils about 2 qrs. 22 lbs. less per acre is used than on cold or clay lands, where an extra 2 qrs. 22 lbs. are added to the quantity as beforehand directed to be used; it is in fact left to the farmer's judgement to make use of the above directions, according to local circumstances. What characterizes this manure most is, that it developes its effects so slowly and gradually, that it may be applied without danger in contact with the seed or roots of plants; in this it differs from a number of other manures which are less rich, but more heating. In Scotland it has been tried in 1834 on eight different soils, has been found nearly equal to bone-dust for turnips, and has since been ordered in large quantities from the manufacturer, Mr. Owen, at Copenhagen, who delivers it free on board at 36s. per ton.—*Ed. Qu. J. A.*

[We have seen in the last year's numbers of the *Annales de l'Agriculture Française*, several notices of the manure referred to above, but none so full as to show how it is prepared, or of what it is composed. The following, however, may throw some additional light on the subject. The remarkable cheapness of the article, of which the English editor speaks, may be perhaps caused by the adulteration which is here made known.]

REMARKS UPON A FALSIFICATION OF THE ANIMALIZED CARBONACEOUS MANURE.

Translated for the Farmers' Register.

The great demand for some years back of animal black, and of the charcoal which is left by the sugar refineries, has determined some persons to speculate on these manures, and to increase their quantity by the addition of matters having a like appearance, but a less value, and containing neither the blood, nor the other matters, which make the base of these two manures. It is important to cultivators to know these fraudulent mixtures, and nothing is more easy, especially in relation to the black earth of Picardy,* which is the most used in these falsifications, and which is now transported for this purpose to Brittany in heavy cargoes.

To prove the existence of this fraud, it suffices to sprinkle a little of the manure in a shovel, to heat it red for some minutes, and then to let it cool. Then if the manure was pure, the ashes left on the shovel will have an uniform grayish color. If it contained the *black earth*, the ashes will present reddish, or rust colored particles, which will be the more numerous in proportion to the quantity of the admixture of black earth. * * * * *

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*This matter, designated also by the names of *black ashes*, and of *pyritous ashes*, is met with in abundance in many localities, particularly in the department of Aisne. It is composed of argil, (or fine clay,) sulphuret of iron, sulphate of iron, of coally and bituminous organic substances. Steeped in water, it gives an acid solution, which strongly reddens litmus paper, (or vegetable blues.)

[A place is given to the following article because it is in reply to one already printed in this No. (p. 79,) and which was inserted principally on account of the remarkably heavy products promised by the writer, from his new mode of culture. We are enough inclined to distrust all such large promises—but the high recommendations with which several of our editorial brethern introduced the former article, gave it, apparently, an additional claim to attention. It is however treated with any thing but respect in the following reply—and our readers may judge for themselves as to the comparative weight of the opposing statements. The tone and manner of the reply, will serve to show with what "scant courtesy" some of the northern farmers are accustomed to treat each other, in the discussion of agricultural subjects.

From the Farmer and Gardener.

POTATOES.

American Hotel, Baltimore, May 19th, 1835.

Having an errand in the office of the editor of the Farmer and Gardener, I had handed me, the 1st No. of the 2d vol., containing an essay of Mr. A. K. Barnum, of Vermont, on the culture of potatoes, which the editor recommended as being worthy of my particular perusal: accordingly I read it, with some attention.

Perceiving the writer to be a theorist, one who aimed at creating an excitement, and that he had contradicted himself; and knowing from my own experience, that his piddling mode, as he has been pleased to call it, is deviating from known and well established practice, and fearing that if permitted to go without refutation from some one, it would be liable to lead many an innocent farmer astray from the true principles of the culture of this valuable vegetable, to their damage, as well as prove a loss to the community, after a more careful perusal, I gave the editor my opinion in full, that the author was not a practical farmer, and that very many profitable remarks could be, and ought to be, made, in order that people should not be misguided.

The editor insisting on my communicating my objections in writing on the subject, I consented, on the ground that he should be connected in my remarks with the author, he having given his opinion strongly in favor of his principles of culture and still persisting therein.

In the culture of the potato, it is necessary to know the nature of it, with respect to its growth, what are its elements, and what its constitution; that is, what it will bear without injury, it being a most delicate root, and what mode of culture is necessary to ensure the most desirable and abundant crop.

I have found by experience, that the potato is not particular as to its choice of soils, or its usage as to manure. It will thrive well on high and on low grounds, in ordinary seasons, if there be no extremity of wet or drought during their growing, and will generally produce a reasonable and satisfactory crop, entirely without manure, but are sure always to repay for extra attention.

The potato above any other vegetable is found profitable to cultivate on new rough ground, among stones and roots, where the ground cannot be sufficiently worked for any other crop usually cultivated, until time and labor renders it more pliable. Here the farmer is greatly benefited in the culture of this crop, as the potato is more peculiarly adapted to rough, half cultivated, grounds than any other crop, and the cultivation, by the more frequently working of the ground, tends to the better subduing of it. The farmers to the north, besides bringing their rough lands to, avail themselves of the certainty of escaping from the evil of the ravages of the worms that so often destroy a crop of corn, by first planting their new swarded ground with potatoes, and it is well to observe, that this swarded ground is far the best for a crop of potatoes. We generally plant to the north ground newly broke up, once with potatoes, and once with corn, and then sow it down to grass and grain.

This mode of culture is of well known and uniform practice. As much ground as a farmer wishes to till is taken up yearly, that is by two years planting it, and managed in this way. Thus it becomes necessary to plant as many acres of potatoes at least as the farmer wishes to take up yearly, for the benefit of stirring his land, and keeping it loose, by distributing his manure in proportion to the land required to be taken up for the benefit of his grass, as well as a proper system of tillage. In this mode of husbandry he does not use the *line*, clear out his walks, nor shovel over his land into beds; but he has use for all his manure for the benefit of his three crops, and to fit the ground for grass. On Mr. Barnum's system, it will take all the manure a very economical, industrious farmer can possibly procure on a considerable farm, to manure one acre, for he recommends spreading and manuring high, the first coat to plough in, then to drill, 20 inches apart with a plough, not less wide to be sure than 8 to 12 inches, and four deep, and in those furrows two inches thick, the first coat requires from 25 to 50 bushel cart loads, the latter will require 50, aggregate 75, this will take all the manure of a good farm. He says there is great benefit to be derived in this mode of using manure from the coming crop. Well may his neighbors say let him piddle with his line, &c.

But above all his deviations from rational farming, is his providing heaps of different kinds of earth, from different situations, near where he plants, to hill his potatoes with; this it seems is not intended as manure, but merely for hilling, as though there was not earth enough: if this last process was to benefit as manure, according to his theory, all the worth of it would soon be evaporated; again, there will be an abundance of weeds and grass, and every foul kind of vegetation before the potatoes are as large as he hills them, which would form a complete turf, and be almost as high as the potatoes; how are these disposed of? We hoe them as soon as they appear, when the potatoes are but a few inches high, or we are punished for longer neglect: how does Mr. B. lay his weeds? they are by his plan sure to get quite large, and very numerous, by the time potatoes are budded.

This doctrine is contrary to all usage, in all my acquaintance in my own state, New Hampshire, New York, and Pennsylvania, where I have lived and farmed it. By the time potatoes are budded for bloom, if nothing be done from planting to that period, a little dirt or compost around the potatoes, would avail nothing towards a crop, it would serve to nurse and nurture the weeds only, and would not benefit the potatoes at all. But if this compost or dirt is used as manure, why not spread and harrow it in, immediately, before the virtue escapes by evaporation; for much of the virtue of manure passes off in this way in a few hours exposure to sun. In his first manuring he is anxious to prevent this effect; but I would ask what becomes of his economy of his manure in the latter application, it being exposed for months to the influence of sun and rain? I conclude, therefore, that Mr. B. is inconsistent with himself.

Notwithstanding the potato will bear poor and indifferent treatment, and produce a crop on any soil, rich or poor, high or low, and with but slight care and attention, (I do not mean not to hoe them at all) it is nevertheless, the most delicate of all plants cultivated. It suffers sorely from the least changes of weather, that is from wet to dry, or from heat to cold, and soon yields to frost. A little too much wet when first planted will cause them to rot in the ground, and if up, a slight inundation will cause them to wilt and die; and if a change from cool and wet to warm and dry, they are much affected, and from dry and warm, to sudden wet, they are also much affected, especially at a time when near maturing, when they are sure to give up; and this is the cause that potatoes are so often not good, having failed to become matured; and let me remind the farmer that all vegetables, at this stage, are in their most delicate state. This is the time too when we are in danger of our grain blighting, and the time it is most frequently blighted, if at all, from sudden heavy rains; and from these causes we had not half a crop of potatoes in New Hampshire the last season, and those but half the usual size. The potato is easily cultivated as I have shown; and they will well repay for good usage, both in manure and good hoeing. I would as soon slight my corn as my potatoes. Mr. B. recommends planting potatoes four inches deep; my experience teaches me the contrary. If I plant low ground, I plough my ground in beds, in a direction for the water to drain off, then harrow lengthwise of the furrows, and the small lands; having a number of these, side and side, I take a light sharp horse harrow, and harrow crosswise of the beds, which pulverizes the ground, and fits it well for planting, leaving a small space between the rows, which answers two purposes, one for a guide for the rows for dropping; this is done by dropping in the middle of the tracks of the harrow, which is easily and correctly performed, by any small boy. It also serves completely to fill up all cracks or holes, the seed lying fair and easy. I then drop my manure directly over the seed potatoes, and when covered up, the seed is safe from inundation, by being some inches above the surrounding surface: the seed lies warm under this manure, the rains drain into the middle furrows. Thus I do not lose a hill when those that *hole* four to six inches for the hill even on common high ground, lose much of their planting.

Another great advantage is derived from this mode of planting, above the great increase of yield, it prepares the ground for a crop of grass.

There are other great advantages from this mode of culture: I plant about three feet distance, it takes the most of the surface that is pulverized to cover the potatoes, and by the time they are twice well hoed, my hills are as I want them to be. They naturally rise high above the surface in form of a sugar loaf; this hill is to turn off heavy rains, and it naturally keeps the potatoes from being too moist, as they are often injured thereby. In harvesting, I find a great advantage in the manure being above the level; the hills being peaked, render them very easy to harvest, and the manure is advantageously mixed with this loose surface over all the ground, taking care to harvest each row by itself, hauling the mixed loam and manure in one direction. This mode gives a rich surface over all the ground, and with a little harrowing, it becomes as smooth as an onion bed: by improving this opportunity it availeth much. This ground is sown in grass, if I choose, in the fall, if early, and it is fitted to sow conveniently in the spring, on the snow, if I choose, or otherwise. This mode of planting potatoes for the benefit of grass, is I think preferable to Mr. B's. mode.

I have obtained what I call very large crops in this way, say one of the most favorable dry seasons, on some portions of the best of the piece, from five to seven hundred bushels per acre, but no average like this. But the influence that the different seasons have on this kind of ground is very great on the crop. Some cold wet seasons, as above, the potatoes on the same kind of ground, have hardly been worth harvesting. I have ascertained in my latitude, 42½, when at home, that potatoes yield best planted shallow, that is, if manured in the hole, to drop them on top of the manure, instead of under; they have thus in some cases, produced double the quantity of those planted under it, in the same kind of holes, made side and side. It is most safe to make the hills as peaked as they can be, conveniently, to cast off the water in heavy rains. It is certain, from experience and observation, that potatoes are more often affected from the superabundance of wet than by drought, and in an average of seasons, therefore, it is wise to guard against the greatest evils. It is not generally known that potatoes hold out and grow best if they lay dry in hills; on the contrary, if the hill be wet through, and continue to be kept wet, it so affects them as to cause a dropping of the leaves, which is called the rust, and they will continue faltering without the possibility of a remedy, in any subsequent stage whatever, if but half grown, as to the root.

Mr. B. prescribes a rule for planting potatoes; I cannot, myself, venture on so invidious a task as to fix a definite rule in a case where its propriety is to be determined by contingencies. The season and soil are so variable, that they render a general rule somewhat imperfect. But I will say, for strong moist ground, well manured, seed high for a large crop: sometimes we may seed too high on quick land, if it be a dry season. But the distance the hills are to be apart is a consideration. I have found that three feet each way is the most proper distance to ensure a good crop, and potatoes of a handsome size, for table use, &c.

Taking this for the distance on the rich prepared ground, as I have described, three common sized potatoes to the hill will be more profitable than any less quantity. It is no use to cut them on such ground. If they should be cut small, the vines come up small and weak, grow fast and fall down, and on such ground the vines will run over the ground and keep green until harvest. I have often found some few ripe, and some in the same hill small and green, and generally very ill shaped, whereas on the same ground with the same culture, seed high with good sized potatoes, planted at the same time, they come up strong and are sure to stand erect, will shoot out their young at the same time, and will grow near of a size, ripen altogether, one or two months earlier, and will be found of suitable size for table; this is the mode that I recommended to obtain the largest crop and far the best potatoes. I have tried every method, even the piddling method of Mr. B. as to distance; it ruins them for a crop, to sow them in the way he has described, and much more in the size.

I once tried an English mode warmly recommended to produce 900 bushels to the acre: it was to prepare the ground and drill two feet apart, and plant the seed lengthwise, the potatoes in contact with each other. They were well attended; the result of the crop was, as any agriculturists would judge, there was after the rate of 900 bushels found on the acre, but the time of finding them was not at harvest, it was when I planted; they produced nothing worth harvesting.

It is observable that Mr. B. speaks of the importance of sun and air in his first mode, as described, as though they were the principal causes operating to produce his large crop when in his latter method he produced his largest crop, though he precluded sun, air and light, from entering into his beds. Where they are sown but one foot apart, if they grow at all, there will be a bed of vines, and if they are kept clear of weeds, as they must be to produce any potatoes; and here too, he omits the great essential of hilling, and yet he gets the largest crop without this very essential and heavy work of hilling, with at least two hundred loads of compost manure to make his hills with, did there ever before, such a wild notion enter any man's brains as to think of hilling potatoes in this way; and can any agriculturists suppose there ever was a good potato produced in this unnatural method? I will also notice his expressions, that are still wilder: he says he did not mean to be understood that 1,800 bushels could be raised by field culture, but now says that eight hundred to 1,200 can be raised upon a single acre, easier than half that crop on four acres, and with less expense. This account implies that he had asserted that 1800 bushels could be grown on an acre, and he surely meant in his new mode of culture. Why does the writer cringe and keep back what he pretends he has done, or said? Not one bushel does he assert, in positive terms, that he has ever raised in any mode of culture; and there is all the reason in the world to suppose that he never did raise a bushel by any culture whatever. But why does he hope to be spared from the shafts of the critic? Because this is a dream of his and he has by relating it in this public manner, caused the excitement that he tells of—an excitement extending even to the four corners of the world—and now he is afraid that he will be questioned on the subject, and dreads lest he should be asked if he ever raised one bushel of potatoes in his manner of culture. I will observe another grand mistake of his, which every practical farmer will readily detect him in—that potatoes planted in neighboring fields of different varieties, are so fond of each other, male and female, and their connection is such that in sending off their farina to each other, by the aid of soft breezes, they lose their caste, and become impure—and this he states is the cause that they so often degenerate.

It is certain that every practical farmer very well knows, they never degenerate by crossing in the least, even if they are planted together in the same hill. It must have been corn that he had heard of mixing from such causes, and I apprehend, being quiet unacquainted with the potato and its culture, he has confounded one plant with the other.

The gentleman to be sure, has stated some important facts, with respect to the manner of harvesting potatoes so as to preserve their qualities long. There is great propriety, as he says, in harvesting them with but little exposure to sun and air; and his manner of binning and turfing them over tight, is highly proper; but I cannot see why the spade or shovel, that the turf is cut and handled with, would not do to beat it down with, instead of a wooden mall. I would rather and what I have said heretofore on the subject, that is, that the sun and air soon generate a poisonous action in the potatoes; so much so, that it is well known that many a noble animal fed on them have died; this has taken place where potatoes have lain in out buildings exposed to the air for a long time, and the animals have been constantly fed on them. The same potatoes, if cooked and eaten by men, would be sure to give them a degree of sickness, if not unto death. If we determine to have good potatoes and to keep them so, they should be harvested by night, or in a cool overcast damp day, and picked up immediately after the hoe, and kept close in a body, entirely excluded from air, and go into the cellar as moist as they came from the hill, and the more moist dirt adhering to them the better. These potatoes will not vegetate the next season to injure them any before the next crop. There is another remark of the writer's which has much correctness in it, that is, that the potato thrives best within the latitudes described by him, and that they grow to greater perfection, and are there of a better quality. This, no doubt, he has been well informed of. This essay would be lengthened quite too long, were I to enter into a minute detail of each objection I have: my desire has been to correct erroneous principles so that farmers should not be misled to their injury.

I will only add, that the distance I have chosen for my hills, is derived from my experience in the culture of potatoes. At this distance, they have a good share of sun, air and light; they also have good space for roots, and strength of ground, so that they will mature a good crop, and if seeded well with whole potatoes, or good sized pieces, they will be found of good and even size for table use, and well ripened in good time, in ordinary seasons.

Varying from this rule, in planting the common large field potato at a greater distance, it tends to an inconvenience in hoeing, as to an easy way of hoeing, over all the ground, and dividing and making a proper light peaked hill, which renders them easily harvested. If on the other hand the distance be reduced, an inconvenience is experienced in hoeing, and shaping of the hill, and an interference in the growth, is very perceptible; the size being reduced in proportion to the distance.

In seeding the potatoes, they should be placed close together in the hills, by which means they are easier worked, give more room for sun and air between the hills, and are more readily gathered when ripe in the fall.

ABEDNEGO ROBINSON,
of Portsmouth, New Hampshire.

P. S. I will further observe, that although the potato of different varieties are so near alike, yet it is a fact that the sun and atmosphere vary in their effects upon different varieties; proving poisonous to many kinds, the white, most of all of them; yet there are some of the colored varieties that those elements have a salubrious effect upon; the long red potato is much improved by spreading them open to sun and air for a few days, especially in the spring. They will become a little wilted and dried, but are nevertheless rendered very pure for eating, and in my humble opinion far preferable to any within my knowledge. There are some other colored ones that will bear sun, but will not improve like those named.

While on this subject, it will be but justice to the state of Maine to remark, that while I have been visiting the middle and southern states, I have observed that all the principal cities, and villages, seem to be almost wholly supplied with the best large potatoes from that quarter. Those most highly esteem ed are called here the *Mercer*, in New Hampshire they call them Shenangoes. This variety sells uniformly for 25 cents a bushel above all other varieties. Notwithstanding the abundance exported from Maine during and since the last fall, her supply seems still unexhausted; which circumstance alone must satisfy every one of the adaptation of that state to the culture of this greatest vegetable friend of man, and of the productive quality of her lands. I must be indulged in the remark, that it is enough to astonish any person to behold the quantity, size, and beauty, of the potatoes, which we see daily carted and drayed through the streets of the southern cities—and which readily find a market at from a dollar to a dollar and a quarter per bushel.*

From the Edinburgh Quarterly Journal of Agriculture.

ON THE PRESERVATION OF POTATOES OVER THE YEAR.

[In the 1st vol. of the Farmers' Register, (p. 213) we gave a particular account (translated from the *Journal d'Agriculture etc. des Pays-Bas,*) of a mode of preserving potatoes for several years, the principle of which is like that of the following, the exclusion of heat. It is strange that so simple a process has not been more extensively used in places where potatoes form an important article of culture and of food.

As the best mode of preserving potatoes until the produce of the next year's crop should be brought into use, is a matter of considerable importance, I beg to refer to vol. XXII. p. 135, of the Transactions of the Society for the Encouragement of Arts, &c. where is detailed the following method adopted with success by M. J. De Lancey, Guernsey.

M. De Lancey says: "early in March, 1803, I observed my winter's stock of potatoes, which I had dug in October, 1802, sprouted from the mildness of the weather in this island. I accordingly took indiscriminately from my pile about three dozen, and in my court-yard dug a hole two feet and a half deep, under the protection of a south-west wall, where the rays of the sun prevail for a few minutes only during the day, at any season of the year. Then, with three pantiles, one at bottom, I laid most of my potatoes in the hole, and placed the other two tiles over them in form of the roof of a house. They not containing all, I threw the remainder carelessly into the hole, (having no great confidence in my experiment,) covering the place over to its usual level. Business calling me home during part of the summer, I neglected looking after my small deposite; but, on the 21st January, 1804, nearly 11 months after covering them, I had the curiosity to examine them, when, to my astonishment, I found them, (two or three excepted, which were perforated by the ground worm, though firm,) all perfectly sound, without having in the least vegetated in any respect, fit for the purpose of sets and the use of the table, as I have boiled a few, and found them similar in taste and flavor to new potatoes. I further pledge myself that they were perfectly firm. I have still some of them by me for the inspection of my friends, who all agree that they are so."

In another letter, dated 17th May, 1804, M. De Lancey says: "I avail myself of the opportunity of a friend going to London, to send three of the potatoes, as a confirmation of their being fit for sets, as they are actually sprouting. The potatoes I send I pledge myself are of the growth of 1802." Then follows the certification of the Secretary to the Society of Arts: "the above potatoes were examined before a committee of the Society on the 30th of July, 1804, and found to be in a state fit for vegetation."

From the above experiment, it is evident that *vaults* or *deep trenches*, out of the reach of atmospheric influence, would effectually retard the growth or sprouting of the potatoes during the period of about *twenty-one months;* that is, from the time of taking up in October, till the 30th of July in the *second year*, or say at least *eighteen months* —and we have here a period of time three times longer than would be sufficient to fill up the interval betwixt the old and the new crop of potatoes.

It is probable, that potatoes for deferred use, say from April to October, would be more safely deposited in January or February than at an earlier period; for it cannot be doubted that when just taken from the field, they possess a succulence and moisture rather inimical to sound storing in large quantities, besides which the examination and removal of damaged sets would contribute much to the security of the deposited heaps. If we can preserve ice from melting, we can surely keep potatoes from sprouting; and the latter is undoubtedly an object of much greater importance than the former. Trenches or vaults would probably re-

*This estimate of value, is entirely too high—the wholesale price of eastern potatoes, during the fall, when they are brought to market, ranges, as in quality, from forty to sixty cents per bushel. We presume our correspondent must have allusion to the retail price in the markets, and not to any sales in quantity. Mercers in the early part of the spring were high, and probably by retail, in the markets, brought the maximum price as named.—Ed. Farm. and Gard.

quire three or four feet of covering of mould, besides all the advantages that can be gained by selection of a situation not less exposed to the sun; and if the potatoes deposited were formed into breaks or divisions of five, ten, or fifteen polls, [bolls?] according to circumstances, with intervening partitions to prevent the access of air, there is little doubt, that by well contrived and well constructed vaults or trenches, potatoes may be kept in excellent condition, from the beginning of April till the end of October for domestic purposes, as well as for the use of horses and cattle.

G.

From the Alexandria Gazette.

STATE OF THE CHESAPEAKE AND OHIO CANAL.

A continuous canal is now open for navigation 110 miles from the basin, in Washington, to eight miles above Williamsport.

The entire cost of the canal, including all expenses, estimated at $4,200,590.

The canal from Georgetown to Little Falls is 80 feet wide at the water line, and 7 feet deep; and to Harper's Ferry averages fully 60 feet in width and 6 in depth, from the point of eight miles above Williamsport it is reduced to fifty in width and six in depth, and will retain the same proportions to Cumberland.

There are no obstructions on the canal to prevent the free passage of steamboats; the only permanent bridge being at an elevation of 17 feet above the water line.

There are 52 locks, and the elevation of the canal as far as completed is 353 feet.

There are five aqueducts, all constructed of solid masonry, and 136 culverts.

The canal is fed by five dams. They are constructed on the most approved plans, of the best materials, and give promise of great strength and durability.

Engineers are now locating the line of the canal to Cumberland.

Experiments are now being made to test the practicability of navigating the canal with steamboats. As yet nothing definite has been ascertained, but the directors do not despair of ultimate success.

From the Norfolk Herald.

THE PORTSMOUTH AND ROANOKE RAIL ROAD.

The great usefulness of this road to the inhabitants of Southern Virginia, is becoming more palpable every hour. We learn that the road has been completed as far as "Murfee's Depot," in Southampton County, (or, rather two miles beyond it,) distant 42 miles from Portsmouth, to which point the cars pass daily. On Friday last, 60 or 70 bales of cotton from the farms of Mr. Newsom and Mr. Vaughan, of Southampton, were received by the road in this borough, and immediately disposed of. We farther learn, that a considerable quantity of cotton is at the depot, and will probably be brought down before this paragraph is put to press. It gives us pleasure to state, that 60 packages of goods, addressed to the merchants of Southampton, were forwarded by the rail road, on Saturday last, to their place of destination.

GYPSUM AS MANURE NOT INJURED BY BEING HEATED.

To the Editor of the Farmers' Register.

Henrico, May 29th, 1835.

In a late No. of your Register, I endeavored to obtain information whether "gypsum submitted to the action of a red heat would lose any of its fertilizing qualities." From your editorial remarks in reply, I felt satisfied that the chemical combination of the lime and sulphuric acid, was not affected by the heating process. Under this impression, I have subsequently made a trial of it on a small scale. If you should consider a statement of the experiment of any importance, it is at your service.

Agreeably to the instructions of my employer, on the first day of April last, I applied gypsum to a considerable portion of clover of one and two years old, at the rate of between three pecks and a bushel to the acre. At the same time, I took promiscuously from a heap of lump gypsum several pieces, weighing in the whole 77 lbs. These I had carefully heated to a red heat, when they lost rather more than 25 per cent. of their original weight. It was given to three of the plantation hands, who in little more than fifteen minutes prepared it for sowing—it then filled a half bushel measure slightly heaped. I applied it to a ridge of clover situated between two ridges which had unburned gypsum applied to them in the same proportion, and on the same day and without any possible difference of the soil. The benefit derived from the application of the gypsum has been highly satisfactory, nor does there appear to be the slightest difference in the benefit resulting from the burned and unburned gypsum. So far as this experiment has gone, though on a very limited scale, I feel satified that the great fertilizing powers of gypsum are not impaired by heating, while the process of pulverizing it is greatly facilitated.

I consider the heating of gypsum to a degree sufficient to dispel its proportion of water, a good test of its quality, and consequently, of its value as a manure. Gypsum which loses, on being heated, from 25 to 30 per cent. of its weight, I think may be considered about the best quality for manure. If, on heating, it should lose less than 25 per cent., I think it highly probable that it contains some foreign substance, which would lessen its fertilizing qualities, and of course, render it of much less value.

Gypsum presents considerable variety and diversity of appearance, and with the view of ascertaining whether any real difference existed as to quality, I selected a few pieces, on which I tried the effects of heat. The following are a few of the results:

1st. A piece of gypsum of light blue color, texture hard, having an oily or greasy appearance, lost, on being heated to a red heat, 26 per cent. of its original weight.

2nd. Do. of a white color, interspersed with veins of a reddish brown—texture very hard, presenting much the appearance of marble—lost 23 per cent.

3rd. Do. of a dull white color—spotted with bright red and gray, having cavities lined with transparent crystals. Lost only 17 per cent.

4th. Do. of a dull white color, with light blue spots; texture very close and hard. Lost rather more than 22 per cent.

5th. A quantity of manufactured gypsum bought in the barrel—lost 20 per cent. An equal quantity manufactured at home from pieces of the above mentioned varieties—lost rather more than 24 per cent.

Should the heating of gypsum be considered as presenting a test whereby to ascertain its qualities, it would appear from the above, that gypsum presenting the appearance of the first mentioned specimen, is the best for manure—allowing that that which contains the greatest proportion of water, which I believe seldom exceeds 30 per cent., is of most value. But in presenting you with the above remark, I beg not to be understood, as positively affirming, that such is the case—though I think it highly probable. I trust however, that some one of your readers may be induced to make the experiment on a larger scale than I have an opportunity of doing, and whose chemical knowledge would be adequate to present more satisfactory results, than my limited experience of that important science to agriculture enables me do.

A. NICOL.

[The experiment reported above is interesting, and its result may lead to much saving of labor in preparing gypsum—and thus enable the farmer to avoid the frauds of some of those who grind for sale. We have made a similar experiment this spring, and in like manner found equal benefit from the gypsum prepared with, and without heat. But in this case, the burnt gypsum was perhaps more finely pulverized, and therefore the fitter for immediate effect: and we should require longer time, and more trials, before deciding positively. The practical result however, is just such as theory (directed by knowledge of the chemical composition of gypsum) would have indicated, though in opposition to the generally prevailing opinion. (See remarks on this head at page 603 and 631, vol. II.)

The water chemically combined with gypsum is in an unvarying proportion—which is 22 per cent., according to the now received opinion. [*Rogers' Guide to Geology.*] Therefore no more than 22 per cent, of weight could be lost by driving off the water alone from the purest gypsum—and the excess of loss, above that proportion, shows that this test (at least as used by our correspondent,) cannot be relied on, except perhaps for comparative results. He lost more than the water chemically combined in every trial but one. This excess of loss might be of additional water held by absorption, (as a hard brick would,) if the gypsum was very pure: or if adulterated with chalk, or any calcareous earth, and the heat was strong enough, the loss would be still more increased by part of the carbonic acid being driven off.]

For the Farmers' Register.

HERDS GRASS ON SALT MARSH.

In answer to inquiries made by a farmer in your 12th No. on salt marsh and meadows, I can say for the last five years I have had several acres of such land well set with red top, or herds grass. The ground is subject to repeated overflowings, both spring and fall, and many times the tide-water from the Sound has been so much impregnated with salt as to leave a white scale or scum of salted matter all over the earth, and on examination I have found it quite salt to the taste, but without its causing any apparent injury to the grass. Apprehending injury from these annual overflowings of the ground with salt water, I had the land the first year enclosed with an embankment to prevent inundation, and through the centre a three foot ditch was cut with a flood gate at its mouth to let off the fresh water not needed, at low tide, and to keep out the salt water at high or storm tides. This answered very well while it lasted; but the first severe gale from the north-east swept away my dam, and the tide-water took complete possession of my meadow. To my disappointment and gratification, I discovered but slight injury to the grass, and in a few days it had a more deep blue and flourishing appearance than before.

The land, before sowing the grass, had been well broken up, and planted two years in corn—but without success—it being too wet and cold, and subject to bugs, for that crop. On preparing the land for the reception of the grass seed, it was laid up into beds of six feet wide, having a small water furrow between each, leading to the main ditch; that the water either from tide or rain, may be more readily conveyed off the ground. Equal proportions of timothy and herds, with half a pound of red clover seed was sown to the acre. The timothy has nearly disappeared, and no clover is to be seen, having been entirely overrun by the red top, or herds grass. The seed was sown the 1st of October.

I have the last year made a small trial of gama grass on such land, and have reason to believe it will succeed and produce an abundant crop of good hay. I find it best to set it on ridges two and a half feet between, and six inches distance on the ridge. The gama I find, on the rotten shell and black sandy loam, to far exceed in rapidity of growth any grass in our part of the country. The seed should be sowed in the garden, kept clear of grass and weeds the first year, and transplanted the first of March in the meadow.

J. B. MARSH.

Beaufort co. N. C. May, 1835.

"STUMP AND BARREL LEGISLATION"—FENCE LAW.

To the Editor of the Farmers' Register.

Fairfax County, May 7, 1835.

I received your No. 11 yesterday, and am indebted to "Commentator" for a sound and hearty laugh, which ended in my referring to your 9th No. in which "Jeremiah" was backed by "X. Y. Z." who showed by plain arithmetic, what "stump and barrel" legislation cost upon 640 acres of land per annum. Now what more shall I do to save my beloved Virginia? Shall I sell that which I have and give it to the poor, and follow the "general assembly?" Will it not suffice that I pay under the command of this high and learned body $220 per annum for confusing, confounding, and commingling my rights with those who claim only to depredate by the authority of the "general assembly?" Did they never read that Moses, who was a bond servant in Egypt, commanded the people by the highest authority, that "they should not covet nor desire other men's goods?" Why should we violate this plain honest command? Are we less than the slaves of Egypt? What am I to say of your much boasted modern schoolmaster? Your great political institutions? Am I to go back and say, as was said of the "beginning," that "darkness dwelt upon the face of the deep?" When I ask in the power and right of justice, why mock me? Why give me a stone when right and justice demand bread? I care not so much for my own rights—but why, in the name of heaven, should we make men familiar with the violation of each other's rights? Why hang a man for the violation of a strumpet, the stealing of a horse, &c. &c., and yet solemnly say he may drive ten thousand hogs upon me to root up and destroy my young timber, grass or grounds? I am not disposed to be disrespectful to the general assembly. I bow to the majesty of the people; but as a free man I shall dare to complain of injuries, come from what quarter they may.

We are professedly a christian people. It is commanded that we should not covet, nor desire other men's goods—yet many good men, who would tremble at the thought of being daily violators of the law of God, are scrupulous and tenacious of carrying out their rights as derived from the general assembly under the fence law. Who will openly say that the principle is unsound which gives to every man that which is his? Sir, I venture to say, that you will not find one in a county: yet I read in the newspapers that many have lost their elections for being suspected of partiality to this command of their Saviour—in plain English, for their love of upright law and exact justice. Are men aware of the dangerous tendency of this unrighteous law? Do they see that in breaking down the strict principles of moral law and christian usage, they are slowly and insidiously giving sanction to Agrarian distribution, and a diabolic scramble for property? Let the moral aristocracy sleep a little longer—let the rust of universal corruption enter a little deeper, and the devils themselves will weep over our fate. The holders of property may then "sleep on," for their hour will have come. I am aware that politicians will avoid this subject as they would a *boa constrictor*, or a rattle snake. To whom then am I to appeal? Sir, I make it to that portion of society who in my youth I have so often derided—I mean the christians. They are, and must forever be the salt of every civilized society—their pure morals and straight upright rules operate like a cement, and sustain the various and complicated machine of government: and that holy principle of their master that "ye render unto Cæsar the things that are Cæsar's," they dare not reject.

JEREMIAH.

Translated for the Farmers' Register from the *Annales de l'Agriculture Francaise* for February, 1835.

LACTOLINE—DESICCATED MILK.

In the sitting of the 9th of this month, the Academy of Sciences has heard a communication from M. Grimand, relating to a substance which he names *lactoline*, which, mixed with nine-tenths [nine times its quantity?] of water, reproduces fresh milk. The substance is not injured by moisture or heat.

NEW DISEASE OF HOGS.

To the Editor of the Farmers' Register.

Cambridge, Md., May 16, 1835.

* * * * To fill up my sheet, allow me to make an inquiry through your widely circulating and invaluable journal, whether a certain disease lately appearing among my hogs, and here quite original and fatal, has been known elsewhere, and a remedy discovered for it. I had last fall twenty-seven shotes, of a very large and valuable breed—six months old—running on clover, and penned and fed every night and morning with corn. In September, one was attacked with a cough, and shortly after a large majority of them. I then separated the diseased from the healthy—the progress of the disease was not rapid, but very fatal—in four or five weeks the animal continuing fat, and with good appetite during that period, began to decline; the cough became violent and convulsive, assuming the appearance of a most inveterate "pertussis." When seized with a paroxysm, the animal would stand contracted in violent agony, coughing for several minutes; its sides spasmodically working, as if it would not survive it. In six or eight weeks from the commencement, a diarrhœa with malignant odor of the whole animal, supervened, and death ensued. I lost nine of these shotes with this disease. In March last, every farrow of the sows remaining on that farm where the disease had appeared, suffered under the same symptoms, and many pigs have died with it. The pigs of several sows removed, previous to farrowing, to a distant farm, were wholly exempt—and what is very mysterious, having sent off the diseased pigs, and brought home to the first farm those sent to the distant one, they began a few days ago to manifest symptoms of the same disease. Therefore, the disease is not only very malignant, but obviously contagious in the highest degree—the yard having been well cleansed before they were introduced.

From the Richmond Compiler.

IMPORTED SHEEP AND HOGS.

Mr. Corbin Warwick, whose farm on James River is stocked with some of the finest animals in the state, has lately imported, from the stock of Mr. Coke, of Holkham, the celebrated English farmer, several sheep of the southdown breed, and two hogs of an extraordinary size. These pigs (which pass pretty well for "whole hogs,") are but nine months old, and yet we should estimate the weight of each at about 400 lbs.

Those who feel an interest in an examination of superior stock, can see these astonishing animals at the lot of Mr. Warwick, adjoining his new residence.

From the Genesee Farmer.

TIME FOR PAINTING HOUSES.

Repeated experiments show that paint put on houses late in autumn, or in winter, will last far longer than that put on in warm weather. In cold weather the oil dries on the clapboards, and with other ingredients forms a durable body, but in hot weather the boards absorb the oil, and what remains on the surface has but little substance.

DELINQUENT SUBSCRIBERS.

Before issuing this 2nd No. of Vol. III, we have erased from our list *nearly* all the names of those subscribers who have received the Farmers' Register from the commencement of vol. I, and have made no payment whatever. If among these there should be included the names of some whose payments have remained due merely from inattention, the erasure will be cause for regret, but is a consequence which the publisher cannot possibly avoid.

This measure will make a heavy *nominal* reduction of the list of supporters of the Farmers' Register—but will be in truth a considerable addition to the clear profit of the publication. Heretofore this journal has been sent to every person who wrote for it, and even to those in the most remote parts of the United States, though totally unknown, and when the orders for the work were accompanied by neither money nor available references. Under such circumstances, (justifiable only by the necessity of extending the circulation of a new work,) it might be expected that there would be very many bad debts. But this extent of confidence has not been often abused: and, taken altogether, the payments have been made with a rare degree of punctuality—and if every subscription now erased remains in default, the proportion of payments made will still be unusually large. It is hoped and believed that the present reduction of numbers will leave a still more sure and solid support to the work.

TERMS OF PUBLICATION FOR FARMERS' REGISTER

1. The Farmers' Register is published in monthly numbers, of 64 large octavo pages each, and neatly covered, at $5 a year—payable in advance.

2. Or five *new* subscribers by sending their names and $20 at one time to the editor, will receive their copies for one year, for that sum, or at $4 for each. Purchasers of any 5 volumes (except Vol. I.) at one time in like manner, shall have them for $20.

3. The risk of loss of payments for subscriptions, which have been properly committed to the mail, or to the hands of a postmaster, is assumed by the editor.

4. For all copies not received by mail, duplicates will be furnished to those subscribers who have complied with their own obligations.

5. If a subscription is not directed to be discontinued before the first number of the next volume has been published, it will be taken as a continuance for another year.

6. The mutual obligations of the publisher and subscriber, for the year, are fully incurred as soon as the first number of the volume is issued: and after that time, no discontinuance of a subscription will be permitted. Nor will a subscription be discontinued for any earlier notice, while any thing thereon remains due, unless at the option of the editor.

AGENCY FOR THE FARMERS' REGISTER.

James Anderson, Esq. (now of Richmond) is appointed agent for the Farmers' Register, and is authorized to receive the names and payments of new subscribers. With this object, Mr. Anderson will soon commence a tour through Virginia, commencing with some of the upper counties.

This agency will in no way affect any other previous arrangements, nor the directions for transmitting other names and payments stated in the terms of publication.

NOTE TO PROF. DEW'S ESSAY ON PRICE.*

The price of lands in Virginia will be kept down in some measure, by the disproportionate rise in the price of negroes, for this reason. Land and negroes make up the capital of the farmer; and the produce which he sells after deducting the expense of cultivation, constitute his net revenue, or profits. Now supposing the value of negroes to increase very rapidly, it is evident that the amount of the farmer's capital will increase in the same proportion, provided the value of the land does not change. That being the case, if his productions remain stationary, or do not increase proportionally in price, it is evident there will be a fall in agricultural profits. Thus suppose there be a farm with 40 negroes, valued at $10,000 while the land is valued at the same, making an aggregate capital of $20,000. Suppose the produce after deducting expenses of cultivation, to sell for $2,000, the latter will be the farmer's profits on $20,000, a profit of 10 per cent. Now suppose a sudden rise to take place in negroes, so that the 40 are worth $20,000, then the capital of that farmer swells to $30,000, and if you suppose the price of his *neat produce* ("*produit net*,") to sell for $2,000 only, as before, then his profits will fall to $6\frac{2}{3}$ per cent. The consequence would be that persons with money capital would not buy land and negroes because of this fall in profits, and that would occasion a fall in land, till agricultural profits bore a proper ratio to agricultural capital. Now the present rise in the price of negroes being occasioned more by causes extraneous to Virginia, than by the rise of her own native products, upon the principle just elucidated, this rise in price will rather have a tendency to check any rise which might otherwise take place in lands, and of course to prevent the speculating rage from reaching them to the same extent as in the south-western cotton country, where the price of cotton, and the extension of the credit system to its utmost limits, will most certainly push the mania for land speculation to a most perilous and alarming extent, soon to be checked by one of those disastrous revulsions, which will spread ruin and dismay throughout that country. In the mean time, the whole banking system of the south-west, if not judiciously managed, may be looked upon as the mighty engine of the times, which by its potent agency, will hasten on the crisis, and magnify the calamities of the final catastrophe.

*This was received after the article for which it was designed, had been printed, and therefore the note necessarily stands separately.

THE FARMERS' REGISTER.

VOL. III. JULY, 1835. No. 3.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ON THE RELATION OF CERTAIN PLANTS TO THE INGREDIENTS OF THE SOIL ON WHICH THEY GROW.

To the Editor of the Farmers' Register.

Your statement in a late number (12) of the Register, has satisfied me that the white or mountain locust (*Robinia pseudacacia,*) is native on the calcareous banks of the lower James River, and perhaps on similar soils of other streams emptying into the Chesapeake.

This brings to mind some similar facts which I had before noted. Bartram, in his Travels through the Southern States, long ago published, remarked, with surprise, the leather-wood (*Dirca palustris,*) and some other northern plants growing on *calcareous hills* in the lower part of Georgia. With equal surprise I remarked the same plant (*Dirca palustris,*) the calycanthus floridas, and a yew tree, (*Taxus montana*?) growing on calcareous knolls in Florida. Pursh found *taxus canadensis* on the banks of one of the streams in Maryland, probably on similar soil.

From these facts may we not conclude that calcareous soils have considerable effect in protecting growing plants from the injurious influence of an ardent sun and a warm climate? And from this may possibly be derived a hint of some value to the agriculture of the south. Thus, is it not probable that, on calcareous soils, good crops of wheat might be obtained in those parts of the southern states where it does not thrive well in the ordinary soils?

It is said that wheat does well in the prairies of Alabama, and I think you have remarked that the growth of clover is much promoted by marling in lower Virginia.

How is it that these soils have this effect? Is it simply by their tendency to *retain* the moisture afforded by rains and dews?

H. B. C.

Newbern, N. C., May 20th, 1835.

P. S. You may be assured that the honey locust is a native of the southern states, and I believe of the northern also.

[Our correspondent is on the right track of an interesting pursuit, which promises abundant and important results to the investigator who is aided by botanical knowledge, and by the wide range of observation afforded by travel. It is gratifying that the subject has now engaged the attention of one who may throw much light on it, and the few facts and deductions to which our correspondent refers, may lead him to others far more interesting. Even under all the acknowledged deficiencies of means for this investigation, we have long ago learned that the limits of the localities of various plants which were supposed to be regulated by climate, were in truth determined solely by the ingredients of the soil; and of all differences in soils in this and other respects, the greatest by far, the most important, and yet the least noticed heretofore both by cultivators and scientific men, is the difference caused by the presence or absence of calcareous matter. We earnestly hope that at least some curiosity is now excited on this subject, and that it will be properly investigated by those who have ample powers and means for the purpose.

The power which calcareous earth gives to soil (directly or indirectly) of attracting and retaining moisture, is an important aid to clover and other plants which require it. But this is far from being its only, or its greatest agency. Many plants, and clover is one of them, require lime as part of their food, without which they can scarcely exist, and certainly cannot thrive, even with every other requisite for growth. Except on a few favored soils, profitable clover culture was impracticable in all lower Virginia before the use of marl, or lime—and since marling, (and with other aids,) growths as luxuriant, as hardy, and as profitable, have been produced in our neighborhood, as any in the rich limestone lands of Pennsylvana; and this on soils that were formerly very poor, and naturally as unfavorable as any to this grass. Still these instances are rare, because the improvement has not yet been extended far, and because all that has yet been written and done, has not removed the long established and general, though erroneous impression, that our hot summers and sandy soils prevented the success of clover. Even our very intelligent correspondent, when alluding to the truth which we are desirous of having inculcated, does not appear to attach to it any thing like its due importance.

It would seem, from chemical observations, that the phosphate of lime is an essential ingredient of wheat —and therefore, that without a sufficiency of that ingredient in the soil, that grain cannot be produced. Whenever there is enough lime in the soil, in any form, wheat will be sure to obtain this necessary but small proportion of the phosphate. But in many extensive regions, as in New England generally, (on uplands,) it is said that wheat cannot be profitably raised —and doubtless, on account of the deficiency of lime in the soil. A quantity of lime too small to cause much improvement of soil, might serve to supply this essential food for wheat—and even a still less quantity of bone manure, the solid part of which consists entirely of phosphate of lime. But such facts are more strikingly manifested by certain plants, which thrive in plenty either upon the total absence, or abundance, of calcareous matter, and which cannot be found under opposite circumstances—as the mountain locust and papaw which we before cited, and others named above—and sheep sorrel, and our poverty grass, (or "hen's nest grass" as commonly called,) both of which are the most abundant growths of our poor soils destitute of lime, and of which not a trace will be found as soon as the land has been made calcareous. The observation of these and similar facts would often serve to indicate the nature, and degree of permanent value of soils, even to the rapid glance of a traveller.

It is to invite such observations that we have offered this hasty comment on our correspondent's remarks. It is astonishing what little attention the writers of descriptive travels (and even those who exhibit their knowledge of geology, mineralogy, chemistry, and botany,) have given to the composition of the soils of the regions which they described. Except from some incidental observations, or minor facts, it is rare that their readers can learn any thing, even indirectly, on this important subject.

But it is time to close these remarks, which are already too extended for their place, and yet too slight for the subject.

CALCAREOUS SOILS NECESSARY FOR VINEYARDS.

In some former remarks introductory to extracts from Bushby's *Journal of a recent visit to the principal Vineyards of Spain and France*, we offered the opinion that calcareous soil was essential to the perfection of grapes, and for obtaining from them wines of the finest flavor; and that to the want of calcareous matter in all the soils used for that purpose in the United States, was probably owing, in part at least, the general ill success of our culture of the vine. The opinion of the superior fitness of calcareous soils for vines, was partly founded on a short passage of the work above named, which described the soil that produces the celebrated Hermitage wine, as being highly calcareous. For that, and other extracts then given, we were indebted to a review of the *Journal*, (never having seen the entire work)—and in another review, just now met with, we find the following extract from the same work, presenting a statement of facts on this head, and more direct and full proof of the truth of the opinion which we before advanced.

When the author speaks of "calcareous soils" it may be inferred from the context (here and in the extract formerly published,) that he means *highly* calcareous—either actual chalk soils, or otherwise such as effervesce freely with acids. But it may be presumed that many if not all the other soils, which he speaks of as not calcareous, though producing good "sweet wines," have lime in some form. He does not seem to speak with much precision on this point—and the soils which he considers not calcareous, may contain more lime than any vineyards in the United States. But without this supposition, it is stated expressly that two-thirds of all the vineyards of France are on calcareous soils, and all those of both France and Spain "producing dry wines of reputation." Is not this statement (putting aside all theory and supposition,) enough to induce the making the soil of some vineyard in this country calcareous? There is scarcely an acre of soil, naturally calcareous, in any of the Atlantic states, and probably not one vineyard, if even one vine, has yet the benefit of a heavy cover of calcareous manure. Yet, from the small space occupied by a vineyard, and the great value of the products, marl or lime might be profitably used at an expense very far exceeding what would be justified by any other crops. If our view is well founded, if it cost $100 to make an acre of vineyard calcareous, it would be a profitable expenditure, compared to the culture, for a number of years, with the usual degree of success. Being a permanent improvement, the cost would be only equal to the interest of the outlay, or six dollars a year—which an improvement of quality of the wine of only a cent in the gallon would greatly overpay. We earnestly recommend the consideration of this matter to several of our subscribers near Richmond and Petersburg who have vineyards, and who could, at very little expense, make the trial. But enough of mere opinion. We proceed to give the author's facts as well as his opinions, in his own words.

"Having recorded with so much minuteness my observations on every vineyard and district through which I passed, I will avoid adding to the length of this journal by offering many general remarks. I cannot, however, refrain from observing, that, from the albarizas of Xeres, the most southern vineyards of any reputation in Europe, to those of the chalky hills of Champagne, amongst the most northern, I met with no vineyard producing dry wines of reputation which was not more or less calcareous. Although it is acknowledged that two-thirds of the vineyards of France are situated upon soil more or less calcareous, by Chaptal, and other writers upon the subject, they have stated that, provided the soil is porous, free, and light, its component parts are of little consequence; and they enumerate granitic, schistose, argillaceous, flinty, sandy, and calcareous soils as equally well qualified to produce, and as actually producing, in different parts of France, wines of the finest quality. It appears evident to me, however, that these writers have, in many instances, been misled by the representations which have been transmitted to them: as, for instance, when Chaptal and Cavoleau cite the wine of Hermitage as an instance of the excellence of wines produced upon the debris of granite; while the fact is, that the wine of the hill of Hermitage owes its superiority over the wines of the other hills in its neighborhood only to the circumstance of the granitic soil of a part of that hill being mixed with calcareous matter; and, but for this circumstance, I am satisfied that the wine of Hermitage would never have been heard of beyond the neighborhood where it grows. I am therefore of opinion, that the finest dry wines owe their superiority chiefly to the quality of the soil; and I am much mistaken if it be not found that the soils of all vineyards producing dry wines of superior excellence are strongly calcareous. All my observations have led me to this conclusion, and I know of no instance to the contrary. It will be observed, that I here only speak of dry wines, for sweet wines of great excellence are produced in a variety of soils, and in fact, owe their qualities more to the variety of the grape, and the manner in which it is treated, than to the soil. The sweet *Muscat* and *Old Mountain* wines of Malaga are celebrated all over the world; but though they have the same varieties of vines at Malaga as at Xeres de la Frontera, and pursue a similar practice in making the wine, the best of their dry wines, produced on a soil consisting of decomposed slaty schist, are insipid and flavorless when compared with the Sherries which are produced on the chalky hills of Xeres. The sweet wine of Rivesaltes, the most celebrated in France, is produced on a granitic soil covered with pebbles; and the sweet wines of Cosperon and Collioure, in the same department, are produced on hills of schist, as nearly as possible resembling those of Malaga. But though the dry wines of both these soils are well known, they are not distinguished for their fineness or flavor. Their excellencies are their strength and rich color, which make them valuable for mixing with the weak and light colored wines of the ordinary growths of Burgundy and Maçon which supply the chief consumption of Paris.

"The limited extent of the first-rate vineyards is proverbial, and writers upon the subject have almost universally concluded that it is in vain to attempt accounting for the amazing differences which are frequently observed in the produce of vineyards similar in soil and in every other respect, and separated from each other only by a fence or a foot-path. My own observations have led me to believe that there is more of quackery than of truth in this In all those districts which produce wines of high reputation, some few individuals have seen the advantage of selecting a particular variety of grape, and of managing its culture so as to bring it to the highest state of perfection of which it is capable. The same care has been extended to the making and subsequent management of their wine, by seizing the most favorable moment for the vintage—by the rapidity with which the grapes are gathered and pressed, so that the whole contents of each vat may be exactly in the same state, and a simultaneous and equal fermentation be secured throughout—by exercising equal discrimination and care in the time and manner of drawing off the wine, and in its subsequent treatment in the vats or casks where it is kept—and, lastly, by not selling the wine till it should have acquired all the perfection which it could acquire from age, and by selling, as the produce of their own vineyards, only such vintages as were calculated to acquire or maintain its celebrity. By these means have the vineyards of a few individuals acquired a reputation which has enabled the proprietors to command almost their own prices for their wines; and it was evidently the interest of such persons that the excellence of their wines should be imputed to a peculiarity in the soil, rather than to a system of management which others might imitate. It is evident however, that for all this a command of capital is required, which is not often found among proprietors of vineyards; and to this cause, more than to any other it is undoubtedly to be traced, that a few celebrated proprietors have acquired, and maintained, almost a monopoly in the production of fine wines."

EXTRACTS FROM A REPORT ON SELECT FARMS,

Made by an examining committee, appointed by the Société d'Agriculture et d'Economie Domestique de Rosay (Seine-et-Marne.) September, 1834.

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francaise*, of November, 1834.

[Of the farm of Chapelles, only part of the observations of the committee are here given, and that, principally, because of the more full notice of the four-shift rotation, which is again referred to in the succeeding statements. Of the two farms of Noas and La Grange, to which the two first prizes of the society were awarded, the remarks of the committee are given entire. The reports on six other farms are omitted. Whether the details here presented to our readers may possess any practical agricultural value, or not, those relating to La Grange will be of some interest, as exhibiting something of the private life, and humble but useful labors, of the illustrious man who belonged to our country as much as to that which gave him birth, and to the world—and whose deeds were more for mankind, and less for self aggrandizement, than those of any, or all the *great men* now leading or governing nations, or striving to attain such eminence.]

Farm of Chapelles, belonging to M. Caron, cultivated by M. Vignier.

The tillage of the lands belonging to the farm of Chapelles, is almost completely subjected to the four-shift rotation, based upon the sowing of clovers on wheat, and of oats upon the clover lay—the rotation most suitable for all kinds of land, because it is readily accommodated to all the partial modifications which may be suggested by the circumstances of the farmer, and of his land—and which is inflexible only on one point, viz: the constant alternation of grain crops and artificial grasses.

M. Vignier did so much the better in adopting this improvement, as his land, naturally wet, having been put in lucerne by a preceding tenant, could no more bear that grass, notwithstanding all his care to establish it. He has not succeeded in making it grow, except upon a lot of land which had not yet borne it. He attributes his success to the use of *poudrette*,* of which he has sown a great quantity at the same time with the lucerne seed. The growth on the part thus sown, is much finer than that of the same ground, in lucerne without *poudrette*. M. Vignier makes considerable use of this manure, of which he knows the good effects on wheat. It is said that its effect is not prolonged beyond that of one crop: but he has made an observation on that head, which deserves to be cited. This is, that a crop of clover, made upon wheat manured from the farm-yard, where there had been, four years before, wheat made on *poudrette*, grew much finer than the other clover made after two such crops of wheat on farm-yard dung, or one crop manured by penning, and one from the farm-yard. Perhaps we ought to conclude that this alternation of *poudrette* and farm-yard manure suits best, especially for humid soils, because that the *poudrette*, by its effervescent action making the soil enter into fermentation, acts not only as [alimentary] manure, but as an improver of the texture of the soil. After the wheat, without doubt the part serving as manure is exhausted, as the action of the *poudrette* is very quick: but the improvement of the soil remains—the earth is warmed, reanimated, and more proper than any other to bear good crops, with the addition of farm-yard manure.

The rotation of the farm of Chapelles is certainly that which suits it the best, and M. Vignier follows it with perseverance and intelligence. All his ploughings are well executed, his ground in the best state of preparation—and yet, though the land of this farm may be of good enough quality, the products are not such as would be desired. The crops of this year, especially, are far from answering to a culture so judicious and well executed. The wet nature of the soil is opposed to complete success: it requires to be tilled precisely at such times and seasons as it is in the best order for receiving tillage, and without permitting the commencement of the difficulties by which the crops suffer. The amelioration of the soil is not yet enough advanced—there remain

*This is dried and pulverized human excrement—prepared generally in towns in France, where large quantities of the material can be collected from privies, or from cleaning out the public "*fosses des aisance.*" —Tr.

still too many traces of imperfect culture—the lands are disposed to get foul with weeds very quickly. These various reasons oppose the suppression of naked fallows, (which he cannot use but with much caution,) and of course, oppose the developement of a system of agriculture entirely prosperous. * * * *

M. Vignier has attempted this year to make a large quantity of field beets, [*betteraves*] or mangel wortzel, (seventeen arpents;)* they were not advanced at the time of our visit, but were coming on well, and will doubtless give good products. He regularly has ten arpents in potatoes, well cultivated.

We remarked a field of rape [*colza*] of some arpents, promising a good crop. This is a novelty, which is so much the more useful as it has had complete success, which will, without doubt, encourage the cultivators of the country to follow the example.

The proprietor of this farm, M. Caron, has not confined to the buildings his participation in the improvements. He has devoted himself, with interest, to all that can favor the culture of the land. A general marling—numerous ditches which he has made at the demand of the farmer—plantations of fruit trees—roads—in short, all that can be useful, is executed by him as soon as the utility is known.

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Farm of Noas—Commune de Pécy.

It is on the farm of Noas that we have seen established most completely, and with the most remarkable success, the regular four-shift [*quadriennal*] rotation. On a middling soil, there are seen the finest crops. Upon 400 arpents of arable land, nearly all unfit for lucerne, M. Vignier cultivates 100 arpents of wheat—70 in clover, made on the manured wheat—90 in oats, of which 70 are upon a clover lay, [*defriche des trefles*,] the balance upon a lay of lucerne, or after vetches, or potatoes, or other roots.

We will again call attention to this point, that generally the soils of this farm are middling—in many places even the land is very bad. Well! no where is there found a bad crop: every part bears what might be hoped from good culture, with success proportioned to the worth of the different pieces of land compared with each other.

The fallow (this year lost for the bad cultivator) is in this farm devoted entirely, according to a rational system, to the melioration of the land, and to the production of useful crops. Fifteen arpents only have been left in naked fallow: this was the part which had need of repeated ploughings, perfectly executed, and at precise times, to bring it to the state of good order common to the other land of the farm: the remainder had been in rye, grazed by the sheep, and in vetches, also grazed or cut green; and five arpents in potatoes and thirty-five in field beets or mangel wortzel. These roots are made after three ploughings, and receive three hoeings [*binages;*] they are of the finest growth, and promise a very abundant crop. M. Vignier has told us that he has made this root at the rate of about 35,000 weight to the arpent—which may perhaps be equivalent to 1000 *bottes* of dry forage. He prefers the beet to the potato, for the consumption of beasts, because it appears to him to contain less of the water of vegetation—and also for the preparation of the soil, because that wheat grows well enough after the beets, whilst the trials that he has made after potatoes have been without success.

The interior of the farm, [homestead, or farm buildings] answer well to the exterior culture. A cow-house contained 24 cows of the finest form, in the best condition, and appearing fit to yield good products. The flock consisted of about 700 sheep, and 200 lambs, all of fine wool. The grown sheep are in good condition; but the lambs appeared not to be in such state as might have been expected. It appeared that the pasturage being short, the lambs had not yet been turned out. This is the only thing which the inspection of this fine establishment showed to be defective; but the good state of the rest of the flock, proves that circumstance is but accidental: and it should be remarked, that the range or "commons" [*parcours*] of the farm is limited to about 450 arpents, near the lands which compose it.*

M. Vignier has established at Noas, at his own expense, those parts of buildings which would have been deficient, as extensive sheds, sheep folds of light construction, and a thrashing machine.

We have no need of telling you, gentlemen, how much satisfaction we have experienced in visiting the establishment of M. Vignier. Such complete success of intelligent labor has confirmed us in the opinion, that the most prosperous destiny awaits agriculture, when it shall have received the developements of industry.

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Farm of La Grange-Blesneau—Commune de Courpalais—belonging to Gen. Lafayette, directed by M. Lécuyer.

We have ended our rural visits with the farm of

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*The arpent is not now a legal measure in France, and was not uniform every where when it was legal. It does not vary much from our acre.—Tr.

*The "*parcours*" does not consist of pasture land belonging to a particular farm—but to the whole *commune*, or territorial district—and indeed the *parcours* of adjacent *communes*, by law, owe reciprocal service, by which the beasts of one *commune*, may be driven to graze on the territory of a neighboring *commune*. See "*Parcours*" Vol. VII. p. 235, *Cours Complet d'Agriculture etc. par l'Abbé Rozier*. Thus the grass furnished to the flock of any one proprietor, by 450 arpents of "*parcours*," is a very indefinite amount—but could scarcely be of much value in any case. There is another legal right of grazing in France, sometimes (as Rozier says) confounded with this, and which is still more injurious to agriculture. This is the local usage and right of "*vaine pasture*," by which the owners of beasts may graze them upon the lands of the *commune* generally, after the crops have been taken off. A similar usage was getting established in Virginia—and though without legal sanction, would have became "time honored" and irrevocable, if *Arator* had not taught us the necessity of protecting our fields from grazing, and thus induced the expulsion of the intruders, before they had become too strong to be resisted.—Ed. Farm. Reg.

La Grange, which will be celebrated as the place of residence of Gen. Lafayette, and which is also for us an object of particular interest, as a rural establishment founded by that illustrious man, under whose presidency our society was formed.

Around a vast yard, (or court) are arranged the buildings belonging properly to the farm.

There are seen sheep folds large enough for a flock of a thousand head. They are well lighted and ventilated, boarded or ceiled, and once a year whitened with lime; so that the flock is kept in the best condition for health.

The flock is not more than seven to eight hundred head. It was found proper to reduce it on account of the barrenness of the common range, [parcours] of which the product has been lessened by the growth of the trees planted on the borders. The flock which is now in very good condition, has been brought to a high state of improvement by successive crossings of the merinos of Rambouillet, which had formed its primitive foundation with sheep of Saxony, of Naz, and of the flock of M. de Jessaint. Its products have been the object of distinction to the meeting of the department.

The great cow-house can contain about twenty-four cows, and is in the most simple form; only the paved floor of it is so inclined that the urine is collected and preserved in a pit, dug outside of the building, from which it was drawn for use.

The cows are generally fine. Part of them came from Switzerland, and others are the issue of the same race. They are all capable of yielding good products. We name especially the cows of Schwitz, which are the best milkers of the farm, and which M. Lécuyer, its superintendent, places above all known of the best in the country as beasts of profit. The bull is of the same stock.

A second cow-house contains cows of different breeds, particularly an English breed, the Devonshire, of which, but a short time before his death, the General received a bull and two cows from England. These beasts have not yet had time and opportunity to furnish means to appreciate their qualities.

At the end of this cow-house is the stable.

Opposite the window of the proprietor, is the habitation of the superintendent, disposed with simplicity and convenience. At the side is the bake-house, an apartment well occupied in an establishment so extensive, and in which the inhabitants, the masters as well as the laborers, and domestics, eat the same kind of bread. In the bake-house, are the entries of two dairies perfectly well situated and arranged, the one for winter, and the other for summer—and also the entrance of the steaming apparatus, of which we shall speak hereafter.

This apartment, and all connected with it, are kept with a degree of order and neatness, which leave nothing to be desired.

The bread is prepared by using a kneading machine, with the operation of which the superintendent is well satisfied, because the dough is well worked, with less trouble and expense than if kneaded by hand. It is a useful instrument—and indispensable in a house where they bake frequently, and in great quantity.

At the end of this building is the place occupied by a steaming apparatus, which has no other ordinary use except the cooking of an immense quantity of potatoes for feeding all the beasts. At the right and left of the boiler, are two vessels which can contain each, fourteen *setiers* of potatoes, and which, well covered, can be cooked in a few hours, the fire being fed by wood of very little value.

We cannot propose this boiling establishment as a model for imitation, except for a large farm and extensive operations, directed on account of the proprietor, or for a model farm: but there, where it is, it renders great service, and is considered as one of the most useful things. It has been made sometimes to serve for purposes of another kind, which in this house are not less precious: it is to give vapor baths gratuitously to the poor and sick, who could not otherwise procure them.

Gen. Lafayette had recently caused to be made in the farm-yard,* a pit, with two large ditches or drains under the dung hill, to collect the water: above the pit is a pump for the purpose of watering the manure from the pit, and ditches which empty into it.

We noticed the poultry houses which are closed on the south with a grating of iron, which permits free entrance to the air. In another yard, to the north, and serving as entrance to the farm buildings, is the piggery: to this the yard is exclusively appropriated. The greatest cleanliness is here preserved—and the animals find all the attention and space necessary for them. They appear to live well, and to be well managed for the yielding of manure.

Next is the press house, where the wine and cider flow by subterraneous pipes into the cisterns and casks placed in a large vault on one side. On the other side are sheds for the various ploughing utensils: and under these sheds there are immense vaults or cellars under ground, designed to hold the root crops, which are poured down through trap-doors, opening under the sheds.

At the east of these buildings there is yet another yard, where stands a vast granary, closed with frames of planks, which are raised or lowered at will. In this building is fixed a thrashing machine.

A great number of utensils of various kinds are put away under the sheds, and particularly ploughs of all kinds: the plough without wheels of Roville, that of M. Rosé, and others Belgian and American, and the Grangé plough: but all the work of the farm is done with the ploughs of Brie.

The object of M. Lafayette being to obtain immediate returns, new experiments have not been treated by him but as subsidiary, and on a small scale. This is a model farm in respect to the product obtained by a good combination of culture, rather than a theoretical school of agriculture.

The lands of the farm consist of about 500 arpents, of which 100 arpents are in turf and meadows, given almost entirely for pasturage for the sheep.

The remaining 400 arpents are of arable land, divided into fields of 24 arpents, by alleys and rows of apple and pear trees. Of these, 96 arpents are in lucerne, 96 in wheat, 48 in oats, 24 in barley, for the purpose of being sowed in lucerne, 24 ar-

*"*Cour de la ferme,*" the open space surrounded by the farm buildings, and not simply the dung yard, or winter cow-pen, as the term is used here.—TR.

pents in field beets and potatoes, and 96 arpents, instead of being in naked fallow, are entirely laid down in common clover, of which only one cutting is taken, and in crimson clover, [*trefle incarnat*,] rye, vetches and peas, grazed or cut green for feeding cattle.

To the potatoes and beets cultivated on 24 arpents succeed oats, on which common clover is sown. After the first mowing of this clover, this piece returns under fallow. The crimson clover is sown upon the stubble of the wheat or oats, and after being once mowed, it also returns under fallow, with the advantage that, this crop being very forward, the land is ploughed in the same time as if the fallow had been naked.

The rye and the vetches of winter and spring, are made upon the stubbles of wheat and oats, and even a sowing of vetches is again made partially after the grazing of the green rye; and after their being grazed or mowed, these lands are also thrown into fallow, which, as may be seen, follows every year, upon 24 arpents which had borne wheat the preceding year: that is to say, this portion of land is cultivated as if in two-shifts; but only one time, until its turn comes again, which depends on the quantity of land to which this exhausting culture may have been applied.

The numerous flocks of the farm secure the means of suitably manuring from the farm-yard, or by folding, the land designed for the wheat crop. But as one part, which had produced wheat the preceding year, exacts a greater abundance of manure, and as there are 24 arpents of beets and potatoes, which require a great quantity of the better manure, the superintendent of the farm, M. Lécuyer, has sought to multiply his supplies of manure, by composing it of *poudrette* and *urate** with the cleanings of moveable privies, and the urine of the cattle, collected, as before stated, in a covered pit. He showed us the experiments which he has made with this manure this year, on some furrows, compared with manuring by penning, and from the farm-yard: and the wheat on this manure, applied at the rate of ten to twelve hectolitres the arpent, was as good as on the land folded on, or manured from the farm-yard. This manure is made, in part, of matters which ordinarily remain in the farm-yard manure; there is this advantage however, that being destined for a particular use, these matters, which are the excrement of horses and urine of cows, are collected and used with more particular care. We have not seen that the manure in the yard of this farm was inferior to that of other farms. In short, if this supply of manure is not entirely a new product, it is certainly an improvement.

There are on this property many thousand fruit trees, now in full bearing. They have already yielded near 300 casks [*pièces*] of cider; and it is believed that this year, that number will be doubled. The average may be counted at 150 casks a year.

A quantity of forest trees are planted, especially wherever there is a waste spot, however small it may be.

Further—the farm of La Grange, a useful model in many respects, is subjected also to very good and careful tillage. The 24 arpents of roots, the 100 arpents of lucerne, the meadows and pastures, the 100 arpents of clover, rye and vetches, which occupy the fallow, the whole pastured or mowed, give an immense product of forage, so that every year there are sold from the farm ten to twelve hundred *bottes;* which is an important profit, and which has been so for some years.

The root crops, followed by oats, and then by clover, offer a partial rotation well arranged: but what appears to us a fault, is the necessity of taking again for wheat one-fourth of the land which had borne wheat the preceding year, and, to make barley, 24 arpents of the land which had borne wheat. This is to return to a bad system, after having come out of it happily. Wheat made upon common clover may often succeed well; but the success of it in our country, is not enough assured to make it the foundation of a rotation. We do not conceal that we found the land, otherwise well ploughed and manured, giving evidence of the defects of this rotation; and that called, each part in its turn, to undergo this forced production, some are found not in that state of cleanness and fertility, which insures good crops. The lucerne also, made in too large proportion, yields less abundantly: it is to this disproportion that we believe ought to be attributed the defects of this rotation. The four-shift rotation founded upon the sowing of clover on the grain crops, with a less quantity of lucerne, might furnish as much forage for consumption and for sale, and not imposing on the land the bearing of forced products, would maintain it in a better state of fertility. The comparison, while we acknowledge the merit of the good culture of La Grange, has confirmed us in our opinion that the four-shift rotation, such as is followed on the farm of Noas, is the most rational, and the most conformed to the invariable principles of good culture. * * * *

From the Cultivator.

AGRICULTURAL BOOKS.

We have been requested, by a correspondent of the Genesee Farmer, to furnish a list of agricultural books, suitable for a farmer's library. This we do cheerfully, remarking by the way, that the number of *American* books is very limited; and that in selecting those of foreign origin, we must take much chaff with the wheat. The elementary principles of husbandry are pretty general in their application, while the practical operations of different countries must necessarily be variant, not only on account of difference in climate and soil, but in productions for the market, price of labor, habits of the people, &c. No European system of practice is therefore exactly adapted to our wants, though it may embrace much that is highly beneficial.

Independent of the memoirs which have been published by the agricultural societies in Pennsylvania and Massachusetts, and by the Society of Arts and Board of Agriculture in New York, the *American* works on agriculture, that we have been acquainted with, are, to name them in the order in which they appeared, 1. Deon's New England Farmer; 2. Boardley's Husbandry; 3. Arator, a series of agricultural essays, by John Taylor, of Virginia; 4. A Treatise on Agriculture, by Gen.

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*Urate, in chemical nomenclature, means salt formed by the combination of the uric acid with any base. But as used here, it must be intended for urine collected in, or absorbed by, any other matter whatever.—TR.

Armstrong; 5. The Farmer's Assistant, by John Nicholson; 6. Lorrain's Husbandry; 7. Essay on Calcareous Manures, by E. Ruffin; and 8. The Complete Farmer, by T. G. Fessenden. These are all worthy a place in a farmer's library, as well as the memoirs first named. Of Nos. 1 and 7, new revised editions have lately been published at Boston and Richmond. Of the others, copies are scarce, and the memoirs, we believe, cannot be purchased. No. 4 is a work of merit, comprising a great mass of interesting matter, detailed with great conciseness and perspicuity. No. 6 was written by an excellent practical farmer, who blended a great deal of useful reading and nice observation with an extensive practice. The writer was a self-taught philosopher, who scrutinized narrowly into cause and effect, and we believe was a very successful farmer. The Essay on Calcareous Manures, is an invaluable treasure to all who can avail themselves of lime and marl, as sources of fertility. No. 8 is principally a judicious compilation from the agricultural papers of our country. A new edition is now in the press. There are several American publications which treat of the orchard and the garden, which it is unnecessary to enumerate, as they may be found in all our seed shops.

Of foreign publications upon husbandry, we should recommend the following, in the order we name them:—Low's Elements of Practical Agriculture; Lawrence on Cattle; Davy's Agricultural Chemistry; Sinclair's Code of Agriculture, and, (last, *only* on account of its expense,) Loudon's Encyclopædia of Agriculture. The Farmers' Series, published by the British Society for diffusing useful knowledge, affords an excellent compendium of British husbandry, though but partially adapted to our country.

But neither foreign nor American books ought to supersede the agricultural periodicals of the day. These abound in communications from our best farmers, and detail the improvements which are continually developing in rural labor. We venture to say, there is not a farmer in the Union, of common intelligence and enterprize, who is ambitious to improve his condition, and who takes an agricultural periodical, that is not more than remunerated for his subscription, by the useful information which he acquires from it. They are generally printed in a form to be easily preserved, and they ought to be preserved. We subjoin a list of such as are known to us, for the benefit of the readers of the Cultivator:—

Published quarterly.—The New York Quarterly Journal of Agriculture, at New York.

Monthly.—Southern Agriculturist, at Charleston, S. C.; Farmers' Register, at Shellbanks, Va.; New York Farmer, New York: Cultivator, Albany; Tennessee Farmer, Tennessee; Fessenden's Practical Farmer, Boston; Rural Library, a monthly publication of 32 8vo. pages, New York.

Semi-monthly.—Farmer and Mechanic, Cincinnati, Ohio.

Weekly.—Genesee Farmer, at Rochester; New York Farmer, at New York; New England Farmer, at Boston; Maine Farmer, Winthrop, Me.; Yankee Farmer, Cornish, Me.; Ohio Farmer, Columbus, Ohio; Southern Planter, Columbus, Georgia.

Devoted to Horticulture particularly.—The American Gardener's Magazine, by Hovey & Co., and Horticultural Register, by G. E. Barret, both monthly 8vos., published at Boston.

Devoted to Silk Culture.—The Silk Culturist, at Hartford, Conn., and the Silk Worm, at Albany.

To Orchards and the Vine.—Coxe on fruit trees; Thatcher's Orchardist; Prince's Pomological Manual; Kenrick's New American Orchardist, and Prince, Adlum, Loubat and Rafinesque on the Vine.

The Quarterly Journal of Agriculture and New York Farmer are from the same press, as are the New England Farmer and Practical Farmer. The Rural Library is a re-publication of American works on husbandry and gardening.

We can neither give the prices of all the books we have enumerated, nor refer to the bookstores at which they can be had. The periodicals may be obtained, by addressing the editors of the respective works.

From Gibbon's Decline and Fall of the Roman Empire.

ACCOUNT OF THE EARLY USE OF, AND TRADE IN SILK, AMONG THE ROMANS, AND FIRST INTRODUCTION OF THE SILK WORM INTO EUROPE.

I need not explain that *silk* is originally spun from the bowels of a caterpillar, and that it composes the golden tomb from whence a worm emerges in the form of a butterfly. Till the reign of Justinian, the silk worms who fed on the leaves of the white mulberry tree, were confined to China; those of the pine, the oak, and the ash, were common in the forests both of Asia and Europe; but as their education is more difficult, and their produce more uncertain, they were generally neglected, except in the little island of Ceos, near the coast of Attica. A thin gauze was procured from their webs, and this Cean manufacture, the invention of a woman, for female use, was long admired both in the East and at Rome. Whatever suspicions may be raised by the garments of the Medes and Assyrians, Virgil is the most ancient writer, who expressly mentions the soft wool which was combed from the trees of the Seres or Chinese; and this natural error, less marvellous than the truth, was slowly corrected by the knowledge of a valuable insect, the first artificer of the luxury of nations. That rare and elegant luxury was censured in the reign of Tiberius, by the gravest of the Romans; and Pliny, in affected, though forcible language, has condemned the thirst of gain, which explored the last confines of the earth, for the pernicious purpose of exposing to the public eye naked draperies and transparent matrons. A dress which showed the turn of the limbs, and color of the skin, might gratify vanity, or provoke desire; the silks which had been closely woven in China, were sometimes unravelled by the Phœnician women, and the precious materials were multiplied by a looser texture, and the intermixture of linen threads. Two hundred years after the age of Pliny, the use of pure or even mixed silks was confined to the female sex, till the opulent citizens of Rome and the provinces were insensibly familiarized with the example of Elagabalus, the first who, by this effeminate habit, had sullied the dignity of an emperor and a man. Aurelian complained, that a pound of silk was sold at Rome for twelve ounces of gold: but the supply increased with the demand, and the price diminished with the supply. If accident or monopoly sometimes raised the value even above the standard of Aurelian, the manufactures of Tyre and Berytus were sometimes compelled by the operation of the same causes to content themselves with a ninth part of that extravagant rate. A law was thought necessary to discriminate the dress of comedians from that of senators; and of the silk exported from its native country, the far greater part was consumed by the subjects of Justinian. They were still more intimately acquainted with a shellfish of the Mediterranean, surnamed the silkworm of the sea: the fine wool or hair by which the mother-of-pearl affixes itself to the rock, is now manufactured for curiosity rather than use; and a robe obtained from the same singular materials, was the gift of the Roman emperor to the satraps of Armenia.

A valuable merchandize of small bulk is capable of defraying the expense of land carriage; and the caravans traversed the whole latitude of Asia in two hundred and forty-three days, from the Chinese ocean to the sea coast of Syria. Silk was immediately delivered to the Romans by the Persian merchants, who frequented the fairs of Armenia and Nisibis: but this trade, which in the intervals of truce was oppressed by avarice and jealousy, was totally interrupted by the long wars of the rival monarchies. The great king might proudly number Sogdiana, and even *Serica*, among the provinces of his empire; but his real dominion was bounded by the Oxus, and his useful intercourse with the Sogdoites, beyond the river, depended on the pleasure of their conquerors, the white Huns, and the Turks, who successively reigned over that industrious people. Yet the most savage dominion has not extirpated the seeds of agriculture and commerce, in a region which is celebrated as one of the four gardens of Asia; the cities of Samarcand and Bochara are advantageously seated for the exchange of its various productions; and their merchants purchased from the Chinese the raw or manufactured silk which they transported into Persia for the use of the Roman empire. In the vain capital of China, the Sogdian caravans were entertained as the suppliant embassies of tributary kingdoms, and if they returned in safety, the bold adventure was rewarded with exorbitant gain. But the difficult and perilous march from Samarcand to the first town of Shensi, could not be performed in less than sixty, eighty, or one hundred days; as soon as they had passed the Jazartes they entered the desert; and the wandering hordes, unless they are restrained by armies and garrisons, have always considered the citizen and the traveller as the objects of lawful rapine. To escape the Tartar robbers and the tyrants of Persia, the silk caravans explored a more southern road; they traversed the mountains of Thibet, descended the streams of the Ganges or the Indus, and patiently expected, in the ports of Guzerat and Malabar, the annual fleets of the West. But the dangers of the desert were found less intolerable than toil, hunger, and the loss of time; the attempt was seldom renewed, and the only European who has passed that unfrequented way, applauds his own diligence, that in nine months after his departure from Pekin, he reached the mouth of the Indus. The ocean, however, was open to the free communication of mankind. From the great river to the tropic of Cancer, the provinces of China were subdued and civilized by the emperors of the North; they were filled about the time of the Christian æra with cities and men, mulberry trees and their precious inhabitants; and if the Chinese, with the knowledge of the compass, had possessed the genius of the Greeks or Phœnicians, they might have spread their discoveries over the southern hemisphere. I am not qualified to examine, and I am not disposed to believe, their distant voyages to the Persian gulf or the Cape of Good Hope: but their ancestors might equal the labors and success of the present race, and the sphere of their navigation might extend from the isles of Japan to the straits of Malacca, the pillars, if we may apply that name, of an Oriental Hercules. Without losing sight of land, they might sail along the coast to the extreme promontory of Achin, which is annually visited by ten or twelve ships laden with the productions, the manufactures, and even the artificers, of China; the island of Sumatra and the opposite peninsula, are faintly delineated as the regions of gold and silver: and the trading cities, named in the geography of Ptolemy, may indicate, that this wealth was not solely derived from the mines. The direct interval between Sumatra and Ceylon is about three hundred leagues: the Chinese and Indian navigators were conducted by the flight of birds and periodical winds, and the ocean might be securely traversed in square-built ships, which, instead of iron, were sewed together with the strong thread of the cocoa-nut. Ceylon, Serendib, or Taprobana, was divided between two hostile princes; one of whom possessed the mountains, the elephants, and the luminous carbuncle, and the other enjoyed the more solid riches of domestic industry, foreign trade, and the capacious harbor of Trinquemale, which received and dismissed the fleets of the East and West. In this hospitable isle, at an equal distance, (as it was computed) from their respective countries, the silk merchants of China, who had collected in their voyages aloes, cloves, nutmeg, and santal wood, maintained a free and beneficial commerce with the inhabitants of the Persian gulf. The subjects of the great king exalted, without a rival, his power and magnificence; and the Roman, who confounded their vanity by comparing his paltry coin with a gold medal of the emperor Anastosius, had sailed to Ceylon, in an Ethiopian ship, as a simple passenger.

As silk became of indispensable use, the emperor Justinian saw, with concern, that the Persians had occupied by land and sea the monopoly of this important supply, and that the wealth of his subjects was continually drained by a nation of enemies and idolaters. An active government would have restored the trade of Egypt and the navigation of the Red Sea, which had decayed with the prosperity of the empire; and the Roman vessels might have sailed, for the purchase of silk, to the ports of Ceylon, of Malacca, or even of China. Justinian embraced a more humble expedient, and solicited the aid of his Christian allies, the Æthiopians of Abyssinia, who had recently acquired the arts of navigation, the spirit of trade, and the seaport of Adulis, still decorated with the trophies of a Grecian conqueror. Along the African coast, they penetrated to the equator in search of gold, emeralds, and aromatics; but they wisely declined an unequal competition, in which they must be always prevented by the vicinity of the Persians to the markets of India; and the emperor submitted to the disappointment, till his wishes were gratified by an unexpected event. The gospel had been preached to the Indians: a bishop already governed the Christians of St. Thomas on the pepper-coast of Malabar: a church was planted in Ceylon, and the missionaries pursued the footsteps of commerce to the extremities of Asia. Two Persian monks had long resided in China, perhaps in the royal city of Nankin, the seat of a monarch addicted to foreign superstitions, and who actually received an embassy from the isle of Ceylon. Amidst their pious occupations, they viewed with a curious eye the common dress of the Chinese, the manufactures of silk, and the myriads of silkworms, whose education (either on trees or in houses) had once been considered as the labor of queens. They soon discovered that it was impracticable to transport the short lived insect, but that in the eggs a numerous progeny might be preserved and multiplied in a distant climate. Religion or interest had more power over the Persian monks than the love of their country: after a long journey, they arrived at Constantinople, imparted their project to the emperor, and were liberally encouraged by the gifts and promises of Justinian. To the historians of that prince, a campaign at the foot of mount Caucasus has seemed more deserving of a minute relation than the labors of these missionaries of commerce, who again entered China, deceived a jealous people by concealing the eggs of the silk worm in a hollow cane, and returned in triumph with the spoils of the East. Under their direction, the eggs were hatched at the proper season by the artificial heat of dung; the worms were fed with mulberry leaves; they lived and labored in a foreign climate: a sufficient number of butterflies was saved to propagate the race, and trees were planted to supply the nourishment of the rising generations. Experience and reflection corrected the errors of a new attempt, and the Sogdoite ambassadors acknowledged, in the succeeding reign, that the Romans were not inferior to the natives of China in the education of the insects, and the manufactures of silk, in which both China and Constantinople have been surpassed by the industry of modern Europe. I am not insensible of the benefits of elegant luxury; yet I reflect with some pain, that if the importers of silk had introduced the art of printing, already practised by the Chinese, the comedies of Menander and the entire decades of Livy would have been perpetuated in the editions of the sixth century. A larger view of the globe might at least have promoted the improvement of speculative science; but the Christian geography was forcibly extracted from texts of scripture, and the study of nature was the surest symptom of an unbelieving mind. The orthodox faith confined the habitable world to one temperate zone, and represented the earth as an oblong surface, four hundred days journey in length, two hundred in breadth, encompassed by the ocean, and covered by the solid crystal of the firmament.

From the Baltimore American.

REGION OF THE TEA PLANT.

A letter has been received by a gentleman of Philadelphia from the Secretary of the Asiatic Horticultural and Agricultural Society at Calcutta, stating that the tea plant has been discovered growing abundantly in the north-east portion of the British possessions in India, adjoining the province of Yunar in China, in which the plant is cultivated. The discovery is announced as one of great importance. It may be doubted however whether it will prove so. Good teas like good wines only grow in particular districts. A vast quantity of the tea raised in China is so ordinary as to be unfit for exportation, and the plant produces best between the 26th and 30th degree of latitude. By a reference to the map, it will be seen that the north-east region of British India does not extend beyond the twenty-fourth degree of latitude. In China itself, although the culture has been widely extended to meet the increased demand throughout the world, by far the best teas are confined to the two original provinces. The inhabitants of Tonquin and Cochin China, countries lying almost between China and British India, are consumers of tea, but are obliged to go to China for their best, being able to raise nothing but a very coarse black tea on their own territory.

From the New York Farmer.

POTASH AS A MANURE.

I was pleased to see an inquiry suggested in a recent number of the New York Farmer respecting the use of potash as a manure as practised on Long Island, but regret to find no answer furnished by those to whom the inquiry was directed. In the absence of better information on the subject, permit me to state what has been my brief experience in the use of this manure.

I had a lot of meadow land, containing about three acres, which had been reduced to poverty by severe cropping. On this piece of ground I made the following experiment. Having broken up the sward, and harrowed it repeatedly until quite mellow, I spread leeched ashes over one acre, and potash dissolved in water over the other two acres; sowed millet seed, clover, and timothy, all mixed together, in the proportion of one part of each of the latter to five of the former, and one bushel of the mixture to an acre; harrowed all in together on or about the first of sixth month.

The ashes cost fifteen dollars; the potash five dollars the acre; the expense and trouble of dressing with potash, about in the same proportion. And now it was a matter of no small interest to me, a novice at farming, to observe the result of an experiment, which when made, I supposed to be entirely original. The crop of millet was fine, and as nearly alike as could have been expected, if the land had all been covered with the same kind of manure. The clover also, all over the lot, was luxuriant, and gave the strongest evidence, to my mind, that potash is the principal agent in leeched ashes, which causes fertility. I made trial of potash on a lot of four acres, which was considered the poorest on my farm, on which I sowed millet with the potash. I sowed at the same time four other acres without any manure, on ground considered much better than the last above mentioned.

I cut double the quantity of hay from that dressed with potash, and of a better quality. Thus far my little experience goes in favor of potash as a manure; but I much desire that some of thy subscribers, of larger experience, and abler pens, would favor us with light on this interesting subject.

T. D.

Burlington 4th mo. 8th, 1835.

[The foregoing statement shows that potash is, for the first year, as productive a manure as leeched ashes, and at only one-third of the cost. But the writer is greatly mistaken in supposing the fertilizing principles of both to be the same. They may be similar and equal in the effects produced, but are still very different in composition. If the ashes were completely "leeched," they were deprived entirely of that substance of which the other manure consisted entirely. The fertilizing principles of such ashes, consist principally of, first, carbonate of lime, second, phosphate of lime, (far more valuable than the carbonate,) and if obtained from a soap factory, of some quick lime besides, added to aid the separation of the potash. All these last are permanent manures—and the potash being a soluble substance, and applied in small quantities, is probably of transient benefit.—Ed. Farm. Reg.]

William and Mary College, June 3, 1835.

To the Editor of the Farmers' Register.

Dear Sir—Since my article on the fluctuation of price was forwarded to you, the stockholders of the James and Kanawha improvement have met, organized the company of directors, and appointed their president. The directors, I understand, are intelligent, business men, stationed along the whole line of the contemplated improvement, and earnestly devoted to its advancement. The gentleman whom they have chosen president has devoted the last six or seven years of his life almost exclusively to the cause of internal improvement. He has displayed in its behalf ability, untiring zeal, and persevering industry, almost unparalleled. Under these favorable auspices, the great central improvement of Virginia will no doubt be quickly executed—producing an influence on the economical, political, and moral condition of our state almost incalculable.

In the exposition which I have given of prices I have spoken of the deleterious drain of our population and capital to the west, and its effect on the price of real property, and of labor in Virginia. The contemplated improvement in our state is calculated to exercise so salutary and so powerful a counteracting influence in this respect, that I have supposed my article on price would be incomplete without this little *addendum*, explaining briefly my views of the operation of the James and Kanawha improvement on emigration, and on the prices of real property, and labor.

With high respect, &c.

T. R. DEW.

THE IMPROVEMENT OF THE JAMES AND KANAWHA RIVERS—MISCHIEVOUS EFFECTS OF THE EMIGRATION TO THE WEST.

For the last half century Virginia has been pouring forth upon the regions of the west the full tide of emigration. She may be literally said to have become the "fruitful mother of empires." Her population and capital, almost as fast as they have increased, have been swept off by this tide to the distant west, and the soil of Virginia has been left comparatively naked and unimproved, whilst this mania has been operating. Is there a young man of promise, upon whose education the kind father has almost exhausted his resources? How apt is he, when he arrives at the age of maturity, to ask for his little patrimony, and move off to the far west. And the hardy laborer, whose strength and industry constitutes his only property, is disposed to follow on in the same direction, where imagination presents in brilliant colors to his view, ample fields and large domains which are to be *all his own*, and where, in the decline of life, he is to enjoy sweet contentment in the lap of luxury and ease.

The evil effect which this emigration has produced on the condition of Virginia is almost incalculable. It is one of the principal causes of our stationary condition, and of the great depression in the price of real property.

The injury resulting from this emigration is much more than in proportion to the mere numbers who leave us. In the first place, the great majority of emigrants consists of males, who are all over the world more productive laborers than females, and these males are generally between eighteen and thirty, at that period of life when their labor is worth most to society. Up to the age of eighteen, generally, the individual is what the economists call an unproductive consumer, and therefore a burden to the state.

In the second place, the laborers who emigrate are generally among the most efficient and enterprising, because, as a citizen of the west once observed to me, in his strong but unpolished language—"it is only the most energetic and hardy who can boldly resolve *to pull up stakes* and move from their homes."

In the third place, many young men whom we lose by this emigration to the west, are those upon whose education there has been made considerable expenditure, and who are always to be ranked among our most valuable citizens, both in a moral and politico-economical view. The man who in any of the learned professions is making $2000 by the exercise of his talents, is worth in an economical light, four times as much as the simple laborer who earns but $500, and more still in a moral point of view.

In the fourth place, a large proportion of the emigrants to the west take along with them a very considerable amount of the accumulated capital of the state, and this paralizes our agriculture and commerce.

Influence of our central improvement on emigration.

Let us now examine into the probable operation of the James and Kanawha improvement on this tendency to emigration. And first, upon the emigration of western Virginia. For some years past, the emigration from the western and middle counties of Virginia has been as great or perhaps greater than from the eastern. The western portion of Virginia, situated at a great distance from market, possessing roads and improvements of the most wretched character, is necessarily forced to become a grazing country. A grazing country admits but a sparse population—few laborers are required to attend to the cattle. "When the stock is purchased and put upon the pasture (says a very able correspondent from the west)—two or three men can readily attend to several hundred, if sold in November: but if reserved for market in January or February, then a few laborers will be required to raise corn (maize) to feed them during the winter months, which is given in aid of good hay. None can pursue this business with any hope of success unless he has large possessions in land."

Now the effect of this system is two-fold. 1st. to concentrate the property of western Virginia in the hands of a few men—and 2ndly, to produce a redundancy of population, wherever the numbers increase very fast; for as it requires but few to attend to the cattle, all beyond become supernumeraries, and are generally disposed to move off to the great west.

Now what is the remedy for this? Most undoubtedly such a change in the whole labor system as will create a demand not only for all the labor which they now have in western Virginia, but all that they can raise there by the procreative energies of society. The great central improvement will produce this effect. By increasing the facilities of transportation to market, farmers will be encouraged to change the grazing into the grain growing system, because the latter is more lucrative than the former, wherever the productions can be carried to market. "Were a conveyance to market practicable (says the same very intelligent correspondent, from whom I have just quoted) of the usual products of the soil, as wheat, barley, potatoes, rice, &c., the grass farm would soon be divided into several farms for the growing of wheat, which is much more profitable. The five acres of land allowed the ox, if cultivated in wheat, would certainly produce fifty bushels, which would be fully sufficient to manufacture ten barrels of flour, worth at least forty dollars! whereas the beef raised from the same ground would only bring from ten to fifteen—at most, twenty dollars."* It is evident then that the moment you convert the grazing system of the west into the grain growing system, that moment will you produce a new demand for labor. Every new plough which is stuck into the ground will require a new laborer to manage it. This will check at once the emigration from the western portions of Virginia, and will produce, no doubt, an additional demand for labor, which will be supplied most readily from the slave population of eastern Virginia. The effect of this will be most happy. It will, by the diffusion of our slave population over the tramontane regions, add to the wealth and prosperity of that whole country, whilst it will give a homogeneous character to our population, and destroy that dangerous discrepancy of interest, whose baneful operation was so decidedly felt in the convention of Virginia, and which, if it continue, will produce the most unhappy and even disastrous effects.

But again: the influence of our central improvement in checking emigration from eastern Virginia, will be almost as great as that which is exerted on the emigration from the western portion. The immediate effects of the improvement will be to pour the immense productions of the west down upon our Atlantic borders, for exportation. This will necessarily produce a great importing and exporting business—a large town, with many smaller ones, must spring up somewhere within our limits—capital will flow into these towns and spread itself over the adjacent country—the towns themselves will create a new and great demand for the productions of the lower country—the whole system of tillage will be changed by the beneficial operation of this state of things—the garden cultivation will take the place of the grain growing system in the neighborhood of the towns, and diffuse an increased prosperity every where. "The farms of Long Island," says Professor McVickar, "are now turned into gardens, and this not by being driven from their old employments, but by the superior temptations of the new—fruit and vegetables gradually taking the place of butter and grain, and thus creating a new demand for land of the next grade of contiguity. This position may further be illustrated by the history of the supply of fat cattle for the New York market. A century ago they were raised on farms adjoining the city; they are now principally raised three hundred miles from it—driven step by step, through the superior profitableness of the new crops demanded by the increasing extent and trade of the metropolis."* So will it be with lower Virginia. The large farms will be broken into smaller ones—these smaller farms will give an increased employment to free labor, while the towns themselves will increase the demand for the same kind of labor much more than for slave. This will check the tide of emigration among the whites, and keep our population at home.†

Thus this great improvement is eminently calculated to check the emigration from both the eastern and western extremities of our state, and keep our increasing population with us. Now I have no hesitation in affirming that this single effect will be worth to Virginia more than the whole improvement will cost. It will raise the price of lands throughout the state—it will increase and multiply the occupations and trades of the community—it will introduce manufactures, cause a rapid improvement in our agriculture, and change the whole aspect of our state.

The immediate effect of the improvement will be to raise the price of labor in another manner likewise. It will cause in the next five or six years the expenditure of millions of dollars along the line of the improvement. This expenditure will increase enormously the demand for labor, and will raise the hire of negroes throughout the state, besides attracting to it free laborers from all quarters. I wish my limits and time would allow me to show, by numerous examples furnished by the history of canals, rail roads, &c. both in this country and Europe, the immense advantage which

*This letter was written in 1832.

*A gentleman from Missouri assures me that a large portion of the cattle for the New York market is now raised in that state, a thousand miles off.

†As the slave is paid for when carried out of the state by a slave dealer, this emigration does not injure the state, because an equivalent value is left behind: unless indeed where the ready sale of the slaves stimulates the seller to sell his land likewise, and take the whole capital with him to the west.

has resulted from the mere expenditure of money in the construction of the improvement. Population thus attracted to the state will frequently form ties within our limits which will make them a permanent accession just at a time when we stand most in need of them.

If every dollar expended in our state on the James and Kanawha improvement could have been procured from abroad at the rate of four or five per cent., I have no hesitation in saying, it would have been better for Virginia to have borrowed the whole sum instead of raising it at home by subscription. For I have no doubt that the tolls on the improvement will ultimately pay much more than interest on the money expended. And we know too that so soon as the line is in full and complete operation, the price of property, and the profits of stock will rise throughout the state—new employments will spring up—increased energy and activity will be communicated to our population every where, and there will consequently be a new and rapidly increasing demand for capital. Hence the greater disposable wealth in the hands of the people, the greater their prosperity at such a time.

I do not however, by the remarks made, wish to be considered as censuring those who favor the joint-stock scheme of our state. It was the only plan perhaps which could have been successfully carried through, and therefore ought certainly to have been supported rather than leave the state without any improvement at all. There are many other advantages which will result from this improvement, but as they do not fall within the limits which I have prescribed for myself in these brief remarks, I will here draw them to a close.

PHENOMENON.

By a gentleman recently from Prince William county, Virginia, we have been informed, (says the Georgetown Metropolitan,) of a remarkable occurrence which took place on the Neabsco tract, about four miles from Dumfries, on Monday sen' night, during that heavy thunder storm, which, it will be recollected overspread the whole heavens, and apparently visited every quarter of our country. The earth for several acres, which was previously firm and good, *suddenly* (from its present appearance) sunk to the depth of about four feet, and cracked open in innumerable places throughout the whole mass, as if it had been blown by gunpowder. The thunder and lightning which here was comparatively slight, there was awfully heavy and severe, accompanied by an abundant shower of hail, which however, was not so injurious to the grain as to the window glass. Numerous persons have visited the spot, but are totally unable to account for the remarkable phenomenon. Some suppose it to have been produced by the shock of an earthquake, although the people residing in the neighborhood experienced, or rather observed no sensation during the storm to justify such a conclusion; yet it is possible such might have been the fact, as from the continual blaze of lightning and the heavy peals of thunder, with a combination of apprehension for their personal safety, they might have had the shock of an earthquake which they attributed to the effects of a raging storm.

EXTRACTS FROM AN ADDRESS TO THE ESSEX COUNTY AGRICULTURAL SOCIETY.

By Ebenezer Moseley, President of the Society, *September* 25, 1834.

Unsettled opinions on Agriculture.

The art or science of agriculture, if examined, will be found to be as far removed from certainty as the law. That is, there is not any settled opinion as to the means of producing the best results. Agriculture, in its highest state of improvement, must be the result of long experience. The great utility, therefore, of agricultural societies, is, that they call forth to public observation the experience and practice of those, who have been most successfully engaged. Yet it is not a little surprising that agriculture, which was coexistent with man, which has passed through all the successive ages and generations of men, which has had the knowledge of this long experience reflected upon it, is yet, probably, in its infancy, and involved in much uncertainty.

I will illustrate this idea of its uncertainty by taking the cultivation of corn. One would naturally suppose, that the long experience among us in the cultivation of corn, would have settled down in establishing in the minds of all men, some fixed and settled rules as to every part of its cultivation. Yet we find that such is not the fact. I begin with the planting of corn. It is not yet well settled, whether the moon has an influence upon vegetation. Some plant without regard to the moon, and some are very careful to plant only in certain stages of the moon. Some recommend soaking and even sprouting the corn before it is planted, others think it does as well without. Some advise planting in hills, while others think a better crop is produced by planting in rows. Some place the manure over the corn, some place the corn over the manure, while others spread the manure over the ground. With respect to hoeing the corn, some think the corn should be hoed while very young, to destroy the weeds, yet others prefer the corn should remain and the weeds grow up till they get to some height. The reason assigned is, that the corn is less liable to be destroyed by birds, squirrels and worms. Some are of opinion that no hill should be made about the corn, while others deem the hilling the corn to be attended with much benefit. Some practise taking the suckers from the corn, while others severely censure this practice. Some are of opinion that the stalks should not be cut until the corn is sufficiently ripened to be gathered; others are of opinion that cutting the stalks* after the farina has fallen, does no injury to the corn, and affords an excellent fodder for cattle in the winter.

Such are some of the various opinions which have been advocated relative to the cultivation of corn. It is not my design in mentioning them, on this occasion, to speak discouragingly of the art of agriculture. My more immediate object is, to show the importance of greater exactness and closer observation on the part of those, who turn their attention to the subject of agricultural experiments.

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* Above the ears, is meant—or "tops" as called here.—Ed. Farm. Reg.

Influence of Agricultural Publications.

The improvement which has been made within a few years in the art of agricultural implements, must be highly gratifying to every farmer. Who, forty years ago, would have thought it possible to raise one hundred bushels of corn on one acre of ground? Yet now, it is no uncommon case for a farmer to raise a much greater crop. This improvement must be attributed in a great measure to the influence of the press. If we go back but half a century, I believe we shall find no periodical publication either in Europe or America which treated exclusively on the subject of agriculture. The consequence was, that in those districts, where particular branches of husbandry were the most successfully and judiciously treated, the knowledge remained with them, unless, perhaps, slowly communicated from one to another, as accident or opportunity should offer. But when journals, devoted to this art, began to be put in circulation, containing the experience of intelligent, learned and practical men, the improvement in particular districts became very generally disseminated. It is true indeed, that in many cases these publications were coldly and reluctantly received, from a false notion, that book learning, especially when it contradicted the opinion they had derived from tradition, must be very visionary. The light of truth has in a great measure removed these errors, and a new era has commenced upon the subject. The knowledge which has been derived from science and experience in one quarter of the world is communicated by the press to all others, and that which was claimed as private property is now communicated for the benefit of all. One fact will strikingly illustrate this subject. When Mr. Knight, president of the London Horticultural Society, sent his first present of new pears in 1823 to Mr. Lowell, his letter and the list which accompanied it, were published in the Massachusetts Agricultural Repository. Within twelve months, application was made for these fruits, and scions were actually distributed from the lower part of Maine to Cincinnati in Ohio.

Among the great improvements which have been made in tools and implements of husbandry, the plough may be mentioned as an instance. Such have been the great improvements in this article, within a few years, that I am told one yoke of cattle will do the work, in one day, which formerly required two yoke, and will do the work, much better. Our ancestors used the flail to thrash out their grain, but modern invention has produced a machine, moved by horse power, and thrashes out as much grain in one day, as one man can thrash in ten days with a flail.

A rake has been invented, moved by horse power. It is said that by this horse rake one man with a horse will put the hay into windrows as fast as eight men can put it into cocks, after it is raked. Among the wonders of the age steam has been applied with surprising success in propelling vessels on water and wagons on land: but in my wildest flights of imagination, I had never conceived the idea that steam could be applied to agricultural purposes. Yet Professor Rafinesque of Philadelphia, a gentleman of great scientific attainments, advertises for farmers his steam plough, by which six furrows are ploughed at once, and which he says will in one day perform the work of a single team for a week, and in the best manner. What a delightful contemplation. How wonderful is man! May we not indulge the hope, that the day is not remote, when all agricultural operation will be performed by steam.*

* * * * *

On the best season to cut timber—Influence of the moon on vegetation.

There is one subject, connected with forest trees, upon which there appears to be a diversity of opinion, and which I wish to present to your consideration, that you may compare it with your own experience. It is, as to the best time to fell

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*The discovery referred to above was advertised as follows, on the covers of the New York Farmer—

"STEAM PLOUGHS.—Professor Rafinesque, of Philadelphia, offers his services to introduce the use of steam ploughs in the United States. If there is a wealthy farmer who owns level land, and has patriotism enough to connect his name with this wonderful invention, whereby six ploughs can be driven, and six furrows cut, as easily as one now, and one day's labor do the work of a whole week—let him apply to me, and I will enable him to have such a steam plough made for himself and all his neighbors, thus setting the example of this wonderful application of steam."

We, like Mr. Moseley, hope that signal benefits will hereafter be derived from the application of steam power to agricultural processes—but would nevertheless advise that but slight reliance should be placed on the labors of Professor Rafinesque for this purpose—as he has been remarkable for ill success (to say no more) in bringing his numerous and wonderful inventions into use. For example—the same paper from which the foregoing is copied, contains the two following advertisements, which, (with another offering to save many millions by a substitute for railway transportation,) were long published to invite the attention of the heedless and obstinate public. Yet it seems that nobody has availed of these magnificent offers of insurance; and houses are still burnt as often as heretofore, ships sunk, and steamers blown up, without the least regard to Professor Rafinesque's benevolent plans, and splendid discoveries.

"INCOMBUSTIBLE ARCHITECTURE.—Incombustible dwelling-houses and buildings of all kinds devised or built in New York, or any part of the United States, as cheap as any other combustible buildings. Actual buildings and houses rendered incombustible at a small additional expense.

Ships of all sorts, and steamboats, rendered incombustible, and not liable to sink, at a small expense.

For sale, 10,000 lbs, of Antignis, or Incombustible Varnish, at one dollar per pound.

Apply to C. S. Rafinesque, Professor of Hist. and Nat. Sciences, Chemist, Architect, &c , in Philadelphia, No. 59 North 8th street. A pamphlet given gratis."

"TO STEAMBOAT COMPANIES.—Professor Rafinesque, of Philadelphia, offers his services to render steamboats incombustible, and not liable to sink, even by the bursting of boilers, or striking against snags, sawyers and rocks. This will save many boats, much property, and the lives of hundreds every year. Those who neglect this easy improvement, deserve to be neglected and deserted by the public as unmindful of safety. Apply, post paid."

timber, with a view to its durability. To me, it is a matter of much surprise, that the opinions of practical men are not uniform and settled upon this subject—a subject so important to almost every man in society, and particularly to those who have any interest in civil and naval architecture. The subject appears to be as unsettled in Europe as in this country, or rather the prevailing opinion in both countries is probably erroneous. It appears to be the more general opinion in Europe and in this country, and the practice has conformed to this opinion, to fell timber in the winter, or while the sap is down; or to be more precisely accurate, in the month of February in the old of the moon. In France, by a royal ordinance of the year 1669, the time of felling naval timber was fixed from the first of October to the fifteenth of April, in the wane of the moon. Napoleon, having adopted the opinion that ships built of timber felled at the moment of vegetation, must be liable to rapid decay, and require immediate repairs, from the effects of the fermentation of the sap, in those pieces which had not been felled in the proper season, issued a circular order to the commissioners of the forests, that the time for felling naval timber should be abridged, and that it should be in the decline of the moon, from the first of November to the fifteenth of March. Commodore Porter, of the American Navy, in the communication which appeared in the American Farmer, gives it as his opinion, that the most proper season for felling timber, with a view to its durability, is in the winter, when the sap has ceased to circulate. He is of opinion that the moon has a powerful influence upon timber, as well as upon many other things.

Notwithstanding this powerful array of authority for felling timber in the winter, while the sap is down, to increase its durability, many experiments have been made which seem to establish the fact that timber cut when the sap is in most active circulation, is most durable. Mr. Benjamin Poor, the owner or occupant of Indian Hill Farm, in this county, in a communication to Gorham Parsons, Esq. published in the Massachusetts Agricultural Repository, states the following fact as within his own knowledge and observation. His grandfather, in the fall of the year 1812, selected two white oak trees, size, situation, general appearance as to age and health and the soil, as near alike as possible. In the month of March following, in the old of the moon, one tree was cut, the timber carried to the mill and sawed into suitable timber and scantling for an ox cart, and put it up to season in the open air. The middle of June the other tree was cut, carried to mill, and sawed as the former, suitable for an ox wagon, and put up in the open air to season, and treated in every respect like that cut in March. In the fall of the year, both parcels of timber were housed, and in the spring following an ox cart was made from one, and an ox wagon was made from the other parcel, both painted, and the work alike in all respects. They were used principally for hauling stone, and if there was any difference in the service to which they were used, it was that the June timber had the hardest. They were both housed in the winter and commonly remained out in summer. Mr. Poor says, at this time (1821) the one made of timber cut in March is very much decayed, the sides defective, much bruised, and a general appearance of decay, while that made of timber cut in June is perfectly sound, has not given way nor started in the joints, or in any respect appears half as much worn as the other, although it has had the hardest service.

The late Hon. Timothy Pickering, the first president of our society, whose zeal and intelligence, connected with his long experience and great industry, give to his opinions much value, appears to have been of opinion, that the best time for felling timber trees for durability, is, when the sap is vigorously flowing. He states the following fact, as communicated to him by Joseph Cooper, Esq., of New Jersey, a practical farmer. Mr Cooper's farm lay upon the banks of the Delaware, nearly opposite Philadelphia, and was exposed to the ravages of the British army while occupying that city. Pressed for fuel, his fences first fell a prey to their necessities, and in the month of May, 1778, they cut down a quantity of his white oak trees; but circumstances requiring their sudden evacuation of the city, his fallen timber was saved. This he split into posts and rails. The ensuing winter, in the old of the moon, in February, he felled an additional quantity of his white oaks, and split them into posts and rails to carry on his fencing. It is now, said Mr. Cooper, twenty-two years since the fences made of the May fallen timber were put up, and they are yet sound; whereas those made of trees felled in February, were rotting in about twelve years. Mr. Pickering treats the notion, that the moon has an influence upon timber or vegetation, as visionary.

I have before said, that it is not yet well settled whether the moon has any influence upon vegetation. It is, indeed, a singular fact, that this subject should remain unsettled even to the present day; and yet it is so far unsettled, that probably one-half of our farmers who have occasion to sow a field of turnips, would prefer the old of the moon. I have never had any belief in the supposed influence of the moon, and have generally adopted the opinion, that industry and sunshine will be very well without any aid from the moon. I have generally ranked this opinion of the moon's influence, with those superstitions which would give importance to the circumstance, whether the moon was first seen over the right or left shoulder, or whether an enterprise would be successful commenced on Friday. And yet some men of great science and experience are firm in the belief of its influence.

It would be an amusing exercise to collect the various opinions and facts, both ancient and modern, upon this subject, but it would far exceed the limits of this discourse. I will however remark, that the ancients paid great regard to the age of the moon in the felling of their timber. Their rules appear to have been to fell timber in the wane of the moon, or four days after the new moon; some say let it be the last quarter. Pliny orders it to be in the very article of the change, which happening in the last of the winter solstice, the timber he says, will be immortal. Columella says, from the twentieth to the twenty-eighth day. Cato, four days after the full. Vegetius, from the fifteenth to the twenty-fifth for ship timber, but never in the increase: trees then much abound with moisture, the only source of putrefaction.

Commodore Porter, we have seen, is of the opinion that timber should be felled in the old of the moon to give it durability, and he expressly says that its influence is nearly, if not quite as powerful as the sun. The commissioners of the French forests require such timber to be cut in the old of the moon, and such has been the standing regulation from the year 1669.

Mr. Staples, of Turner, in the County of Oxford and State of Maine, in a communication in the New England Farmer, describes himself as above the age of seventy years, and during the greater part of that time has been a practical farmer. He removed to this place at the age of twenty-two, when the country was new, and was among the five first settlers, and has given particular attention to the moon's influence on timber, vegetation, &c. He says, that it is a truth, that the moon operates upon the earth and every thing which grows upon it, much more powerfully than is generally imagined. It is also true, that the effects of her operation vary regularly, as she passes through her orbit or monthly course. Timber, cut in the wane of the moon, will be much more durable than it would be if cut between the new and full moon. Her operations are so great and different in the various parts of her orbit, that by cutting one tree three hours before the new moon, and another of the same kind six hours afterwards, and preserving them one year, a very striking difference in the soundness of them will be discovered. If I had known, says Mr. Staples, as much at the age of twenty-two years, as I now do, relative to this subject, I am satisfied it would have benefited me more than a thousand dollars, particularly in clearing hard wood land and in getting durable timber for buildings of all kinds, and for sleds, carts, &c.

He says, I have found by experience that fruit trees set out in the wane of the moon, and particularly on the last day of the last quarter, are more likely to live and be flourishing, than when set out at any other time. I have proved by experiments for ten years in succession, that an apple tree limb or graft, cut off in the month of May, about three hours before the moon changes, and carefully set out, will grow and do well.

Another writer says, that in the months of May, June, and July, oak trees, in the new of the moon, will readily part with the bark, when, in the old of the same moon, the bark will adhere closely.

Such are some of the opinions and facts to support the affirmative of this question; but opposed to these opinions may probably be found most of the scientific and practical agriculturists of the present day. Doctor Dean and Colonel Pickering, men of great experience, practical knowledge and accurate observation, consider these notions of the moon's influence as visionary. There are certain operations of the moon upon the earth, which are obvious and admitted by all. It affords us light by night, it turns the earth in some degree from its elliptical orbit, it occasions a small oscillation in the earth's axis, it causes the ebbing and flowing of the sea, and a like effect upon the atmosphere. But heat, which is the cause of vegetation, has never yet been discovered in the collected rays of light from the moon. Experiments, made at the Royal Observatory in Paris, have proved, that the light of the moon condensed by a powerful lens, had no effect whatever in altering chemical products, though very sensibly and easily affected by the light of the sun. Another fact is, that the most opposite weather in different parts, take place at the same instant of time, and of course under the same phases of the moon.

It was probably from opinions prevalent in the days of Solomon of certain influences in the heavens, that he was led to make the mild rebuke—"He that observeth the wind shall not sow, and he that regardeth the clouds shall not reap."

From the National Intelligencer.

UNION GOLD MINING COMPANY OF VIRGINIA.

A party of Cornish miners arrived at New York, a few days since, in the ship Boston, of London, and passed through Philadelphia on their way to the Company's Mines. We are informed also, that a large amount of machinery, of the most approved construction, is expected daily. It is gratifying to perceive that the attention of British capitalists has been at length awakened to the great mineral resources of the southern states. It is natural to suppose that native American enterprize will derive much advantage and information from the well-directed operations of the London Company, whom it may be presumed have been very choice in their selection of men and machinery, and from the known success of the Brazilian Mining Company, whose profits amounted to $250,000 per annum. These foreign capitalists may reasonably calculate on a largely profitable return. We now confidently anticipate some fixed results, which will more completely develope and satisfactorily determine the character of the gold region of the southern states. The future conduct of similar operations must be much modified and directed by the successful results of the present undertaking. The skill and science which will be here evinced, cannot fail to save many engaged in similar enterprises from much useless expense and disappointment.

From the New Monthly Magazine.

CAUSE OF FAILURE OF THE POTATO CROP.

Mr. Hickley has communicated to the "Irish Farmer's Journal" a very singular and successful experiment tried upon the potato in the county of Dublin. A gentleman who holds a farm of 150 acres, planted in the usual manner 34 acres under potatoes in 1832; the result was, a complete failure of the crop. This induced him to try many experiments upon the root, all of which failed except the following: he took six potatoes and divided them into twenty cuts; he then got a large basin of water, into which he put a cupful of salt and a piece of blue stone about the size of a walnut. He put ten of the cuts into the basin, and let them remain there one entire night. On the following day he procured a very strong microscope, through which he examined the entire twenty cuts. On the ten cuts which were not immersed in the basin he could distinctly perceive many small white particles like eggs; and those cuts which were not immersed presented no such appearance whatsoever. This discovery urged him to follow up the examination attentively; and every day for a short period, he continued to watch the appearance of the aforesaid matter. The result was, that those white globular particles were animalculæ, for in a few days they became quite visible to the naked eye in the form of worms or maggots. The cuts that had been steeped never showed the slightest appearance of any such thing; and they retained their solidity and firmness when the other ten cuts were completely decayed and rotted. Still unwilling to believe without further proof, he tried the experiment five or six times, and planted them, distinctly marking a division between those cuts which were steeped and those that were not. The consequence was, the almost total failure of one kind and the complete success of the others placed the question beyond the possibility of a doubt. He considers that the air has a powerful effect on the potato, and may sometimes impregnate it with this destructive matter.

From Scientific Tracts.

HAMMERING STONE.

A physician of this city has invented a machine, recently patented, for hammering and facing granite, or any other kind of building stone. The mechanic who constructed a model for the patent office, at Washington, informs us that he considers it in the light of a happy discovery, as faced stone may be shortly afforded as cheap as brick. A number of hammers, weighing not far from twelve pounds each, are set in motion either by steam or water power and move with such rapidity that the fragments fly like dust in a windy day. All the hammers move diagonally across the stone, in two directions, thereby completely levelling and smoothing it by simply passing the block onward under them and back again. One of these machines, on a large scale is being erected at South Boston. Should it answer the expectations of the inventor, the old fashioned method of hammering stone will be wholly neglected as one machine will accomplish as much in a day as twenty or thirty men.

[A wiseacre who conducts a northern paper boasting of some 20,000 subscribers, after publishing the foregoing statement remarked that "this is very well —*provided* that the money saved by the invention shall be given to the stone cutters thrown out of employment by the use of the new process." Having mislaid the paper, we quote the words from memory and therefore probably not exactly—but the luminous idea is not stated incorrectly. Its promulgator is a true supporter of the principles of the restrictive policy—of the protecting duty school: and the same views would have prohibited the first use of ploughs and mills—and in short, every labor-saving implement and process that have benefited the world, and have served to distinguish men in the civilized, from the savage state.]

From the Troy Whig.

BURDEN'S HORSE SHOE MACHINE.

The mechanical skill and inventive power of our townsman, Mr. Burden, appears to be in constant and active exercise. We had the pleasure of examining, a few days since, at the Troy iron and nail factory, a recent invention of his for the manufacture of horse shoes, which, for curious mechanism, and practical importance, is equal to any thing which the genius of *constructiveness* has produced for many years. By the operation of this machine, a heated bar of iron is converted —as if almost by magic influence—into horse shoes, of any size that may be required, that for cheapness, neatness, and smoothness of external appearance—firmness of texture, and practical utility, are greatly superior to the article now in general use. The admirable adaptation of the machine to the purposes for which it is intended, and the great rapidity with which it operates, is truly wonderful.

Extract from Featherstonhaugh's Geological Report, Published by order of Congress, 1835.

ACCOUNT OF THE LEAD ORE, AND MINES OF MISSOURI.

* * * * I became now desirous of finding some natural sections that would assist in explaining the phenomena around me, but I could find none, and could hear of none, so that it became necessary for me to examine the localities where mining operations were conducted, in order, by an examination of the subterranean arrangement of the metallic beds, to form some estimate of their direction and extension towards those parts of the country where the public lands lay. I accordingly visited the most ancient "diggings" which had been partially carried on ever since the French had had possession of the country, but I found that the irregular manner in which those diggings had been conducted almost baffled every attempt at systematic investigation. The sulphuret of lead, or "mineral," as it is called in the lead country, has been, in certain localities, at all times found in fragments near the surface of the ground, from the size of a pin's head, in which it can be picked up in great quantities where the rain has washed the soil, to masses weighing several hundred pounds. Sometimes pieces of an intervening size are found, which have been affected by attrition; but, more frequently, the "mineral" preserves its angles very fresh, as it might be expected to do from its brittle cubic structure. Various opinions have been entertained of the cause of so singular a distribution of this mineral substance in loose pieces, and occasionally in such great quantities, near the surface of the earth—a circumstance which has occasioned the whole adjacent country where the mineral has been found, to be excavated into pits from six to twenty feet deep, so that in the localities of such districts it would be impossible to drive any carriage by daylight, and impracticable to ride securely on horseback by night. The disorder into which the country has been thus thrown, is entirely owing to ignorance of the geological structure of the country, and the commonest principles of mining, and is much to be regretted, as it will greatly embarrass future efforts, in those localities, at systematic mining. It would be superfluous to enter into any mineralogical detail of those diggings, or to render a very particular account of any of them, since nothing can be more rude than the attempts at collecting ore which they exhibit. In particular localities immense quantities of sulphate of barytes, or "tiff," as it is named, masses of quartz rock, cellular, and occasionally coated with mammillary crystals of great brilliancy, and, in other instances, a pro-

fusion of dark red clay, are thrown out of the diggings, together with the mineral.

It was at Mine la Motte I first received satisfactory evidence that the broken up mineral I had seen in the diggings had been occasioned by an accidental derangement of the regular structure of metallic veins, and to which I had always attributed these appearances.

The country around presents an extensive table land, almost denuded of timber, through which a few slight streams run, which are used to wash the soil taken out of the shallow diggings. The whole surface is cut out into pits of various sizes, from four feet diameter to some exceeding twenty feet square, with an equivalent depth. These larger areas have been the result of a discovery gradually made, that the loose fragments near the surface, which were formerly the sole object of the diggings, were connected with *mineral* imbedded in the solid rock. Hence, large areas have been opened, without much relation to method, sometimes to the extent of half an acre, and gunpowder is employed to blast the metalliferous rock; so that mining in this particular district is become precisely what quarrying is every where else. The history of these diggings, and the manner in which the sulphuret of lead is often found, is as follows. The streams washing through the superficial gravels sometimes disclose valuable deposites of the ore. Adventurers follow up these indications wherever found, and commence their diggings: when they reach a depth of twelve or fifteen feet, or as soon as it becomes inconvenient to throw out the earth, or hoist out the mineral, a new digging is commenced, and again abandoned for a new excavation. Frequently the superficial soil for about a foot will be red earth, mixed with mammillary quartz, called here "mineral blossom," and petro-siliceous stones; a deposite of red clay of a few feet is then generally found, resting upon a bed of gravel and flinty pebbles, in which the lumps and fragments, including extremely small pieces of ore, are found. Deposites of this kind do not differ, in any particular of mechanical arrangement, from any gravel deposites I have seen, especially the gravel deposites of gold in the southern states, and which are, without exception, the detritus of rocks brought into these superficial beds by aqueous transportation. Beneath these free deposites lies the real metallic formation of the country, consisting of the fetid calcareo-siliceous rock before described, frequently so much decomposed as to admit of being shovelled out, and traversed by horizontal bands of bright galena, or sulphuret of lead, sometimes one inch thick, and frequently a foot thick. In other situations, the ore is very much disseminated in the rock, although always confined in a vein or bandlike breadth, of different dimensions. Where the ore is much disseminated, and the rock is speckled with metallic particles for a great breadth, the ore is usually less productive, yielding about forty or fifty per cent. of lead, when the compact mineral in other situations yields sixty-five per cent. Upon such occasions it appears to contain an excess of sulphur. In some instances, I observed broad veins with a considerable dip, but generally the bands of ore were nearly horizontal. This locality appears to furnish a full explanation of the singular manner in which the ore and sulphate of barytes, in which it is often sheathed, have come into that free and broken situation in which they are found in the superficial deposites. I observed veins at the top of the metalliferous formation, and beneath the superficial deposites, in quarries fifty feet across, and twenty feet deep, containing fragments of ore of various sizes, bright and sharp, with the vein, as well as that part of the rock through which it passed, much shattered and dislocated, the back of the vein being broken in numerous places, and the contents exhibiting strong marks of sudden violence. Sometimes the galena was rent in shivers, sometimes its horizontal sheet was broken up, and parts of the bright ore, ten inches wide, left standing on their edges, some in one direction, some in another, and the remainder left flat in its old place. In some places the phenomena resemble those presented in the chalk cliffs near the Isle of Wight, in England, where the beds are upset, and the seams and nodules of flint shivered. This is not the case, however, with all the veins. In various quarters at Mine la Motte, especially those which go by the name of Mine la Prairie, where more than half an acre of ground has been uncovered to a depth of twenty feet, the sulphuret of lead is not only seen running horizontally in hard compact veins in the calcareo-siliceous rock, but is sometimes disseminated for a great extent, in specks through the rock, affording to the eye sufficient proof that the stony and metallic matter was deposited at the same time; for if either of them were abstracted, no principle of adhesion would be left for the remaining mineral: occasionally the rock changes its character, becoming either calcareous or siliceous altogether, and, indeed, the structure differs so much as to be sometimes hard, sometimes soft, sometimes granular, sometimes compact. Sometimes a bed of sandstone, three feet thick will lie upon a seam of bright mineral six inches or a foot thick, though more generally it is much thinner, and lies in a flat plate. I have however, seen it in veins of two feet thick. The deepest digging or quarrying I observed at this place did not exceed twenty-five feet; they had not yet begun a regular system of sinking shafts and cutting out drifts, but no doubt this will soon be done, as both the public and private lands around the whole region of Mine la Motte are, in my estimation, underlaid by rich veins of galena, that descend very deep towards the central parts of the earth. The superficial indications of this mineral are unerring.

On the approach to a mineral district, numerous localities present a confused, but distinct and rather unvarying character of crystallization. Imperfect nodules of siliceous matter, masses of mammillary quartz, the crystals of which are often superinduced upon chalcedonized concentric layers with an agate structure, indications of sulphate of barytes, with small fragments of sulphuret of lead in the rain furrows, betray the metalliferous rocks: these are the situations which are chosen to commence new diggings in, and with invariable success as far as respects the finding ore. But from some works which have been recently constructed, and which I had an excellent opportunity of examining, I am confident a thorough reform in the whole system of mining in that interesting country is about to take place, and that it will henceforward be conducted upon acknowledged principles, consistent with the true nature of metalliferous veins, and that economical administration of the mines which will enable them to contribute powerfully to the national resources.

These works, which, when I visited them, belonged to Messrs. Taplit and Perry, are distant four or five miles from Vallée's mines and about twenty-five miles from the point where I observed the quartzose sandstone jut out into the Mississippi. They are situated in a small valley at the foot of a ridge of calcareo-siliceous hills, and abound in the external indications I have before described. The proprietors, disregarding the superficial ores, and confiding in the metalliferous nature of the rock formation, had boldly sunk a shaft, in imitation of some practical miners from England, on the other side of the hill, and had been rewarded with the most perfect success. In sinking this shaft, they had come, at random, at a depth of about sixty feet deep, through decomposing calcareo-siliceous rock, upon a vein of sulphuret of lead, and going down, had reached another horizontal vein upwards of one foot thick, and throwing out from it numerous subordinate veins and threads, into all of which they had cut drifts, wherever the mineral was sufficiently abundant. They had sunk this shaft to a depth of about one hundred and ten feet, when I was there, and very obligingly let me down into it, and gave me every aid and facility in examining their works, which enabled me to observe the very curious structure of these metalliferous rocks, and to form a satisfactory opinion of the geological structure of all this remarkable country.

In pursuing the maine horizontal vein, I came, in succession, to a great number of cavities or pockets—analogous to those of some parts of the gold region in Virginia—in the calcareo-siliceous rock, of various sizes. Some of these caves, as they are there called, are not more than four or five feet across, whilst others are much more extensive. I examined one which was about forty feet from top to bottom, and about thirty-five feet in diameter. The uniform horizontality of the veins would keep the true nature of their origin in great obscurity; but, before I reascended, I had an opportunity of examining what they called the *main channel*, which proved to be an almost vertical vein, filled with compact galena, and about eighteen inches broad. I found the course of this lode to be about N. N. E. and S. S. W., with an inclination of about 18°; and upon examining it further, and reviewing what I had seen before, I had no longer any difficulty in understanding that these horizontal veins, and their subordinate ones, were lateral jets from the main lode, after the manner that Mr. McCulloch has described the structure of the horizontal injections of trap rock into sandstone at Trotternish, in Scotland.* Having made these observations upon the direction of these veins, I commenced an examination of their structure more in detail, and found they were all what is called in some of the mining districts of England *wet veins*, being, without exception, encased, not in sulphate of barytes, but, in pure brigh red argillaceous matter, quite wet below, and cutting with a bright waxy face. This red clay accompanies the galena wherever it goes, always including it as in a sheath, and carrying along with it sometimes nodules of quartz, and of iron, zinc, and galena, which last compound is called by the miners *dry bones*. Every one of the pockets or cavities was filled with this red clay, even the large one I mentioned; but at the bottom of each of them was a thick bright plate of sulphuret of lead, that seemed to have sunk to the bottom by its specific gravity. All these circumstances seem to point to a projection of this metallic and mineral matter from below.* At these mines, when circumstances are favorable, they can raise and bring to the surface, as I was informed, five thousand pounds of the mineral a day —a quantity that could be easily quadrupled if the demand for the metal justified it. This sulphuret yields sixty-five per cent. pure lead of commerce. I had occasion to observe, in numerous instances, that the mineral indications on the public lands were quite as encouraging as at the established mines; but this mineral of lead, to judge from obvious appearances, exists in such inconceivable profusion in the metalliferous region of the south of Missouri and the north of Arkansas, that, like the iron of which I am about to speak, it may be relied on for countless ages as a source of national wealth, and an interminable supply of the most useful metals.

* Vide McCulloch's "Western Highlands of Scotland."

* During the eruption off Sicily, in 1832, when the volcanic island was formed, the agitated ocean was filled for several weeks with red mud.

From the Same.

REMARKABLE DEPOSITE OF IRON ORE.

Having completed my examinations of the lead mines, I pursued a southerly course, with the intention of visiting the district of primitive rocks, as it had been described to me, which lies on about the same parallel with the heads of the Merrimack river. At a considerable distance I perceived very lofty hills of a different aspect from any I had yet crossed, and having an abrupt and stony ascent. The rocks upon the slope of the chain are for a considerable distance denuded, and present a well defined syenite. The chain at a distance appears to run N. E. and S. W., but, upon crossing it, and examining it inside, it deflected into a crateri-form, reminding me in some of its features, of some ancient volcanoes I had seen. In various portions of this district I found varieties of greenstone, alternating with some horizontal rocks entirely quartzose, and containing no lime. Upon one lofty hill of syenite I found immense breadths of this siliceous rock, extremely and ponderously impregnated with iron; and at a distance of about a mile from this, the iron increasing in quantity in the intermediate distance, I came upon one of the rarest natural metallic spectacles I have ever seen. Upon a mound sparingly covered with trees, I observed a veinlike mass of submagnetic iron, and having a bright metallic fracture, of a steel gray color. This vein was about one hundred and fifty feet above the surface of the adjacent plain, and at the surface had the appearance of being roughly paved with black pebbles of iron, from one to twenty pounds weight; beneath the surface it appeared to be a solid mass. I measured the vein from east to west full five hundred feet, and I traced it north and south one thousand nine hundred feet, until it was covered with the superficial soil. Unusual as is the magnitude of the superficial cubic contents of this vein, yet it must be insignificant to the subterranean quantity. This extraordinary phenomenon filled me with admiration. Here was a single locality of iron offering all the resources of Sweden, and of which it was impossible to estimate the value by any other terms than those adequate to all a nation's wants.* Upon a more minute investigation of the country, I found other similar metallic beds, though not of an equal extent, and all upon the public lands.

Extract from Featherstonhaugh's Geological Report.

NOTICE OF THE PRAIRIES WEST OF THE MISSISSIPPI—THEORY OF THEIR FORMATION.

From the Caddo to Tournois creek, the distance is about fifteen miles, always upon good level soil. Part of the country, however, was sandy, with heavy beds of a bluish green arenaceous clay, containing a trace of lime. I found no fossils or impressions in it, but was induced to believe it was the equivalent of some tertiary beds I had seen near Shirly, on James river, Virginia. The whole of this part of the country almost seems to be underlaid with rotten limestone, derived from broken down marine shells. The country hence for several miles, consists of good bottom land, full of holly and laurel, with occasional hills of old red sandstone of moderate size, with their usual pine trees. Having gone about twenty miles, the country fell again to the south, and I soon came to an important stream which rises to the north west, and empties into the Washita, called the Little Missouri, from its waters being of a dusky red, muddy color. On crossing this stream, I entered upon a dense low bottom of the richest soil, covered with cane, holly, laurel, and swamp timber, intersected by numerous bayous; this lasted for three miles, when the country began to rise a little again; and, after advancing a few miles, I came upon a singularly black waxy soil of a carbonaceous color, entirely different from any thing I had yet observed, except the surface of the travertin, at the Hot Springs, which, as I have before observed, was not dissimilar to this, agreeing further in the profusion of helices and other land shells with which it abounded. The country here appeared to consist of a chain of prairies running westward, and parallel with Red River for a very great distance. Some of these prairies were mere bald spots, of half an acre and upwards, surrounded by plants, whilst others were said to contain several hundred acres. In every instance they were surrounded with a belt of timber and plants peculiar to the country. I was informed by Judge Cross, a gentleman well acquainted with the country, and to whose intelligence and hospitality I owe many obligations, that these prairies extend probably many hundred miles to the west, and that it is an opinion deserving of being entertained, that plants are encroaching upon the prairies generally. It was with sincere pleasure I found myself upon geological grounds, with which I was well acquainted. The prairies were covered with the fossils which, as I have before observed, characterize the New Jersey green sand formations,* but the superficial soil was uniformly of a deep black color, resembling charred wood, and in wet weather is of a waxy, plastic consistency, that makes it extremely disagreeable to move amongst. Its fertility is remarkable, and renders it eminently fitted for cotton, which, as I had many opportunities of observing, succeeds well. The black soil, which is substantially calcareous, contains, as I found from slight experiments, a proportion of carbon.

This was one of the most lovely countries I had seen, a gentle rolling surface and fine woods, in which is an abundance of the indigenous crab apple,† with the beautiful bow wood,‡ or bois d'arc, as it is usually called. On examining where the streams had abraded the lower parts of the land, and digging in various places, I found that all these portions of the country, which consisted of prairie land, were bottomed upon immense beds of rotten limestone, derived from the testaceous remains of the mollusca I have named, entire shells of which in a soft state are still imbedded in the broken down masses once composed of shells. The zone of black land here does not appear to have a breadth of more than five miles; wherever it is, the same fossils are found, with the undervalves profusely scattered around on the surface. Sometimes the black earth gave place to a deep red marl of great fertility, but in this marl I found no shells; they seemed peculiar to the black prairie land. It was evident I was here upon an ancient floor of the ocean, from which we may infer it had retired with comparative tranquillity, the surface being so little disturbed. The broken down marine shelly matter had accumulated into local beds and extensive hill deposites, after the manner in which we know some existing species accumulate, and the general irregularity of the surface was not dissimilar to that which is presented by the various soundings of marine coasts, where recent surfaces are forming. These accumulations are more or less covered with a vegeto-animal deposite, that, by the constantly acting power of the elements, is partially removed, and carried by rains towards the streams; hence this covering is diminished in some places, and thickened in others. In some situations the black soil is two or three feet deep, whilst in others it is only a few inches thick, in which latter situations the tender roots of plants, having in extreme dry weather, to contend with a caustic calcareous bed, are liable to perish; the Indian corn for this reason, is sometimes what is called fired, its leaves drying up and wasting away. These characteristics of the prairie country, as far as this particular zone of prairies is concerned, is common to a vast extent of country to the west of the points I examined. To the east the zone extends from north latitude 33° 40′ to north latitude 32° 30′, in the state of Alabama§,

* It yields about sixty-five per cent. of fine iron, but is found not to weld easily, which I attribute to an excess of sulphur.

* Gryphæe convexa, exogyra costata, &c. &c.

† Malus coronaria, twenty feet high, ten inches in diameter.

‡ Maclura aurantiaca.

§ Wells, five hundred feet deep, have been dug through rotten limestone, into slate with quartz.

and can be traced at intervals to north latitude 40° 30′, in the state of New Jersey. Throughout this very extended line, all of which I have personally examined, the characteristic shells of this subcretaceous formation have been found. I possess gryphæa, exaggra and other shells, from localities far up the False Washita, the neighborhood of the Kiamesha, from Mount Prairie in Arkansas, from Mississippi, from Prairie Bluffs in Alabama, and from New Jersey, all of them identical; and in the subcretaceous deposites of Alabama, I have found the greatest profusion of the fossil equivalents of the genera peculiar to the green sand beds of Europe. I hope at no distant period to be able to trace, with some precision, the ancient littoral bounds of that geological period, so clearly demarcated by all the unequivocal circumstances I have described.

In relation to those areas which have received the appellation of prairies, from their surfaces, denuded of timber, being at certain seasons covered with long grass, I am not of the opinion of those who think that all prairies have originally been produced by firing the timber annually, and thus, by repeated combustions, destroying the timber as well as the sprouts. That much ground has been denuded by such means, I would admit, and the cause certainly would appear a sufficient one for those prairie districts to which no other cause apparently could be assigned. By whatever method plants begin first to germinate in such deposites, it is evident, as I have before stated, that where the vegetable matter is thin, and the season unfavorable, they are liable to perish; and where they would not altogether perish, it must be remembered that this country was stocked, as the more distant prairies still are, with buffalo, which would, by their periodical occupation of the country in numberless herds, assist in exterminating plants of a vigorless constitution. These may be enumerated amongst the efficient causes of a prairie or meadow state of extensive tracts of country. This view of the subject is somewhat strengthened by the fact of plants, in modern times, encroaching on the prairies; for I have observed they encroach on the sides where vegetable matter has been washed and accumulated, finding a nutritious bed there, into which they can push their innumerable delicate fibres, secured from the devastating teeth and hoofs of the buffalo, which have now all left this part of the country; for where man settles, that animal never remains long. But there is also another view of the subject.

These vast prairies of the west, as well as the diminutive ones in question, must be admitted to be ancient floors of the ocean. When it abandoned them, they were, of course, without plants; and unless we admit their spontaneous growth, we must suppose them to have germinated from seeds derived from plants growing on lands which had been left with a higher level than the ocean, before it receded from these prairies. Their borders would, of course, be planted first, and thus we can conceive of every new generation of plants giving some of its seeds to the winds and the waters, and gradually extending the forests, like the present members of the human family, advancing upon, and settling the country for the uses of posterity. This seems a more natural and just method of accounting for the immense prairies of the west, and the pampas of the southen portion of the South American continent, than conjectural opinions founded on a convenient method adopted by the Indians of securing their game, and which they have practised at all times, certainly with the effect of thinning, but without destroying the timber, as we know from the immense forests of Virginia, Tennessee, Kentucky, Indiana, Missouri, and Arkansas, which were once annually fired by the Indians, to burn the high grass, that they might better see their game—a practice which destroyed the undergrowth, but only thinned the trees; and now that the Indians have left these countries, we find the undergrowth rapidly occupying the ground again. Before we receive opinions altogether hypothetical in relation to the cause of the prairie condition of land, it seems as if we were bound to inquire what was their first condition, consistent with the geological fact that they are ancient floors of the ocean. It, therefore, appears to me to be probable that many of these prairies have never, since the ocean left them, been covered by any vegetables of greater importance than the gramina. Under this view of the matter, it is consistent to suppose, what is personally known to me to be the fact in many observed instances, that trees and plants may be transplanted to those prairies with perfect success.

AMERICAN CEMENT.

The Catskill Recorder thus speaks of this article, which is manufactured by a company in the City of New York:

"The cement, which is at first like ordinary mason's mortar, becomes by age and exposure, as hard as granite itself, and resists the action of frost under any circumstance. We were shown cisterns, well curbs, sections of an aqueduct, and a monument, which were said to have stood in the open air through the last winter, and the summer thus far. These, when struck smartly with a trowel, gave out fire, and a clear ringing sound, which indicates the absence of any flaw. The cement is first moulded, then polished with a trowel, and after it has had time to harden, glass itself could not be more absolutely impervious to water. In all situations where it is desirable either to confine or shut out water, the cement answers every purpose, and is withal as we are informed, a very cheap material. In the process of hardening, it suffers no contraction, and in constructing from it works of any kind, no other care seems necessary than to protect them from being mutilated or defaced; while in a green state. This material is now employed for a variety of uses, and every day calls for its application to some new purpose. We think that it will yet be extensively used in the construction of docks, aqueducts, canal locks and rail roads. The facility with which it may be moulded into blocks of a uniform size and shape, seem peculiarly to recommend it for bed stones on which to lay the rails; and in answering such a purpose, it may very materially reduce the expense of rail roads as at present constructed."

From Meyen's Voyage round the World.

SINGULAR TRADE IN BRAZIL.

Many owners send their slaves for daily employment to the neighboring quarries, while very many others send them out to catch insects: and this is the reason why the most brilliant insects are to be had so cheap at Rio de Janeiro. When a man has attained to some adroitness in this operation, he may on a fine day catch in the immediate vicinity of Rio more than five or six hundred beetles. This trade in insects is considered very lucrative, six millreis (four rix-dollars, or about fourteen shillings,) being paid for the hundred during our stay. There is a general demand for these brilliant beetles, whose wing-cases are now sought for the purpose of adorning the ladies of Europe —a fashion which threatens the entire extinction of this beautiful tribe. The diamond-beetle (chlamys bacca Kert., and especially the chlamys cuprea, Klug.,) was in great request for brooches for gentlemen, and ten piastres were often paid for a single beetle.

PRACTICAL DETAILS OF MANURING—SINGULAR COLLECTION OF SHELLS AND BONES.

To the Editor of the Farmers' Register.

Charles City Co. Dec. 26, 1834.

In compliance with your request that the members of the agricultural community contribute to advance the interests of agriculture through the medium of the Farmers' Register, I have determined to throw in my mite, contenting myself with the reflection that although this communication may fail to afford either interest or pleasure, yet the motive and object will be duly appreciated, and the manner and matter receive the indulgence of an enlightened community.

The farm on which I reside is a gray soil, lying on a substratum of yellow sand, with the clay at the distance of from eighteen inches to two feet below the surface. It had been reduced to the lowest degree of poverty by the system practised by our ancestors, when I came into possession of it in 1823. I immediately cast about in my mind for means and resources for improvement. The object was to sustain my family, and at the same time improve some land. I therefore immediately enclosed a lot of ten acres, which was improved and cultivated in corn and peas for several years in succession. The corn was planted five feet each way, with as many pea hills as corn hills. It was gathered and shucked out as early as the corn would bear gathering, and my hogs turned upon the peas. This lot added from sixty to eighty barrels of corn to my crop annually, whilst the peas assist very much in fattening my hogs. Indeed, I know nothing better than a field of green peas to put hogs in a thriving condition, and prepare them for the pen. Another lot of eleven acres was now added to the first improved and cultivated for several years in succession (through necessity) either in corn or wheat. The production of these lots very soon convinced me of the value of improved land—having reaped for two crops in succession, twenty bushels of wheat for one seeded, from land, which had not within the memory of any man living, produced more than five or six for one. Having now come into possession of other land I was enabled gradually to extend my improvement to the field-system, collecting materials from every resource in my power, which are carried through the stables, farm pen, hog pen, &c.

The farm pen, or shelter, is situated about the centre of my arable land—within forty yards of the barn and stables, where each field corners. It is built of pine slabs on cedar posts put in the ground in the form of an octagan, closed entirely around except a space of fifteen feet on the south side to admit the stock. The yard is graduated to the centre in the form of a shallow basin, which receives the water, and retains it in the vegetable mass, and being too shallow to retard decomposition or putrefaction, yet retains the essence of the manure, so that nothing is lost. In this pound the cattle are penned every night through the year, and during the winter both day and night, except for a short period in the evening when they are turned out to water. I know that in this respect my practice is different from most of our best and most experienced farmers: but from experience I am induced to believe it suits my situation and circumstances better than the more common mode of summer cowpens. The stables are well supplied with a fresh bed of litter every night, and their contents suffered to remain until the mass becomes twelve or eighteen inches thick, when they are cleaned out, and the manure removed immediately to the standing farm pen, spread regularly over the yard, and covered with straw or pine leaves. I always prefer removing the stable manure to the farm pen during a rainy season, or to anticipate a rain, as the essence of the stable manure will be immediately carried down into the bulk below, and mixed with the whole mass. Loads of pine litter from the woods are always carted in previous to carrying in the stable manure, for the purpose of protecting it from the sun and atmosphere.

Under this system the additional labor of hauling the manure made in summer to the field is incurred, but I am satisfied that a much larger space can be manured during the same period, than by the usual mode of summer cow pens. I act upon the principle that labor directed to the raising and applying manures rarely, if ever, fails to remunerate the farmer—one acre of good land being, in my estimation, worth ten, or perhaps twenty, of such as is really poor. This farm pen is cleared of its contents twice a year, in December and April. The manure accumulated from the last of April to December, is then carried to the field intended for corn, deposited in heaps according to the strength of the land, and is covered with common earth, if it is to remain for even a few days before being turned in the land. The manure is thus protected from the sun and atmosphere, and a portion of that which would have escaped, imbibed and retained by the cover of earth, which becomes the more readily mixed with the soil to assist in the process of vegetation. A brisk boy of fourteen or fifteen years old will cover the heaps of manure as fast as a good team of oxen and three horse carts can carry it to the field—say a distance of 700 yards. The manure made during winter is all carried out and ploughed in, as before observed, for the corn crop in the spring, and the only litter used in the farm pen up to this period, consists of straw and pine leaves. Immediately after carrying out the manure in spring, we commence carting in corn stalks, which is continued until they are all used. This mode of using the corn stalks is preferred, because they are not so soon converted into manure as straw, or litter from the woods, and they have a longer period to remain in the farm pen through summer.

All the manure made is applied to land previously marled—a very fine bed of which I have near the centre of my arable land. My marl is that which I think is generally termed yellow, being a decomposed mass of various kinds of shells tinged with clay. No sand is discovered in it. I have applied only 200 bushels to the acre, and believe from several experiments made on a small scale, that quantity sufficient for my land. There are several indications of marl in my neighborhood—and a deposite has recently been discovered of very good quality. I have but little doubt that many deposites of this valuable manure are yet to be discovered, and that our worn-out and neglected country is destined to be brought to a state of gradual improvement.

On my friend Col. J. S. Stubblefield's farm, on Chickahomony, there is found a curious deposite of muscle shells, extending on the bank of the river about one hundred and fifty yards on a level with the flat land, and covering a breadth of from thirty to forty yards. These shells are found on the surface, and extend to the depth of from three to four feet, imbedded in rich black mould. This deposite contains a considerable portion of carbonate of lime, and has been used extensively by Col. S. who is an industrious and enterprising farmer. In this deposite of shells are found a number of human bones of all sizes, from the smallest infant to the full grown man, interred in pits of various size, and circular form; and in each pit are found intermingled, human bones of every size. Standing in one place I counted fifty of these hollows, from each of which had been taken the remains of human beings who inhabited this country before the present race of whites. These remains differ in several particulars from the Indian burying grounds heretofore discovered among us. Might they not furnish curious matter of speculation to the antiquarian? It is time I should bring this desultory communication to a close.

JAMES H. CHRISTIAN.

From the New York Farmer.

DRY ASHES DESTROY LICE ON FOWLS.

When confined, or when simply roosting, in an inclosed house, hens are apt to become infested with lice, in the warmer months. Dry wood ashes, put on the ground where they dust themselves, will, says a farmer, who has given much attention to poultry, very soon entirely free them.

S. F.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

Introductory and comparative view of the different breeds of British sheep.

Among the various animals given by the benevolent hand of Providence for the benefit of mankind, there is none, perhaps, of greater utility than the sheep; which not only supplies us with food and clothing, but also affords constant employment to numerous indigent families, in the various branches of the woollen manufacture; and thus contributes, in no small proportion, to the productive labor, the commercial prosperity, and the opulence of this highly-favored island.

In a wild, or natural state, the sheep is a vigorous animal, lively, and capable of supporting fatigue; when domesticated, indeed, it loses much of these properties, but amply compensates for the absence of them by the superior advantages arising from the rearing of this sort of stock. In fact, on most soils, sheep constitute a material part of a farmer's live stock and profits; and as particular attention has, of late years, been bestowed on the improvement of the respective breeds, we shall first present the reader with an introductory view of them; which will, we trust, convey an adequate idea of the different varieties, together with their specific characters, and the peculiar advantages they respectively possess. The general management of these animals will afterwards form a subject of discussion.

Naturalists maintain that all the varieties of different animals, of the same species, have been derived from one parent stock; and, arguing upon this hypothesis, the origin of our native breeds of sheep has been deduced, by some from the *moufflon* of Corsica, and by others from the *argali* of Siberia, both of which still exist wild in the mountains of those countries. The moufflon is, however, mentioned by very ancient authors as a distinct animal, and, indeed, it appears to partake more of the nature of the goat; but the argali, which is spread throughout Asiatic Russia, and many parts of Persia, has much of the appearance, and many of the habits, of the common sheep. Whatever degree of credit may be attached to this conjecture, it is certain that sheep were found in a domestic state in England at the earliest period of which we have an account; it is also probable, that they were then of one species only—the small horned kind; and there can be little doubt, that the various breeds in existence at the present day, have gradually arisen through the progress of cultivation, and experiments in crossing, as well as from those differences, which will naturally arise, when they are long confined to soils of opposite quality. It might prove an object of curious research, to trace the improvements that have been made in this important branch of rural economy; but, this treatise being intended solely for the use of men of business, our inquiries are necessarily confined to the actual breeds that compose the present stock of the country, of which the following are the chief.

I. The *Heath*, *Linton*, *Short*, or *Forest Sheep*, are names indiscriminately given to the several varieties of the same breed, which is found in the north-western counties of England, and thence forward to the western highlands of Scotland.

The specific characters of this race are, large spiral horns; faces black or mottled, and legs black; eyes wild; carcass short and firm; wool long, open, coarse and shaggy; fleece averaging about three pounds and a half at four years and a half. They are of a hardy constitution, admirably calculated for elevated, heathy, and exposed districts; and, judging from this aptitude to support the hardships of constant exposure in a wild pasturage country, as well as from the form of the horns, which is characteristic of the animal in its unimproved state, it may be not improbably inferred, that they are directly descended from the parent stock of the kingdom. The true black-faced breed, is said to be distinguished by a lock of white wool on the forehead, termed the snow-lock.

In moorland tracts, where the pasturage consists rather of heather than of green herbage, these sheep have been found more valuable than some which, in more favored situations, might be considered superior; and although they have been superseded in some instances, yet they still maintain their ground on the bleak hills of the north, many of which, indeed, would be wholly unproductive to the farmer under any other stock: their flesh is highly flavored; and when fattened on the lowland pastures, they make excellent mutton. There is another moorland breed, of an unmixed race, existing on the Yorkshire wolds, which differs from the former, in having the face and legs white, with a thin flat carcass; but in point of hardiness of constitution, and the characteristic distinction of large horns, it is nearly similar. Both range over the heathy mountains in the summer, without any attending shepherd; and, on the approach of winter, they are brought nearer to the enclosed grounds, that hay may be given to them during deep snows, and also that they may be prepared for the severity of the season, by being salved: an operation which will be hereafter more particularly described.

The other *horned breeds* of English sheep are—

II. The *Exmoor* and the *Dartmoor*, which derive their names from the districts in the northern and western parts of Devonshire, where they are chiefly found. They are long-woolled, with white legs and faces, and are delicately formed about the head and neck; they make very finely flavored mutton; and arrive, when fatted, at two and a half to three years old, to fourteen and sixteen pounds weight per quarter.

The country in which they are reared, is generally over-charged with water, after the autumnal rains, yet this breed sustains the chill of the wet ground even in the infant state, without becoming subject to the rot, which has proved fatal to some other species that have been attempted to be introduced, and even to crosses. Their summer pasture is scanty, and their winter food consists chiefly in what they can pick up, in ranging over extensive tracts of pasturage, with the assistance, in the severity of extremely bad weather, of a little indifferent hay, made from the coarse herbage of the moors; and perhaps occasionally with a small supply of turnips, which are sometimes cultivated, but which, from the wetness of the land, they are often prevented from resorting to when most wanted. From this superior hardiness of constitution, and more especially from their power of resisting wet, which is generally so injurious to sheep, nature has evidently adapted them to the soil; it is not, therefore, to be much wondered at, that the attempts made to improve them by crosses with more tender breeds, have not been attended with all the success that was expected. A cross with the old Leicester sheep has, indeed, increased the weight to twenty-four pounds per quarter; and another, with the Spanish merinos, has improved the quality of the wool; but the foot-rot and the scour have in both instances made great ravages; and until some effectual system of drainage be adopted, by which the pastures may be rendered dry, and shelter be provided by enclosures, the most rational hope of improvement must rest upon increased attention to the native race.*

* See the Agricultural Survey of Devonshire, p. 338.

III. The *Norfolk Breed* is indigenous in the counties of Norfolk and Suffolk. The horns are large and spiral; bodies long; loins narrow, with a high back and thin chine; the legs long, black, or gray; of a roving, wild disposition, and not easily confined within any but strong enclosures. The wool of the original breed was short, the fleece weighing from two to two and a half pounds; but within the last twenty years, in consequence of crosses and new modes of feeding, the weight has been increased full a pound, and the greater part is now used for combing purposes.* The carcass has been proportionably increased; and though the mutton has not been thereby improved, it yet is well flavored, and of a fine grain, but only fit for consumption in cold weather.

The agile form of these sheep, enabling them to move over a great space of ground with little labor, was of vast advantage to the old Norfolk farmers, many of whom were possessed of large tracts of heath-land, which they had no means of bringing into cultivation, except by the assistance of the fold. Mr. Marshall characterizes them, in his account of the Norfolk husbandry, as being singularly well adapted to the soil and system of management prevalent in that country: thriving upon heath and barren sheep-walks, where nine-tenths of the breeds in the kingdom would starve; standing the fold perfectly well, yet fatting freely at two years old, and bearing the drift to distant markets with comparative ease. Mr. Kent has been equally warm in their praise in his survey of the same county; yet notwithstanding these strong testimonials in their favor, they have long been giving way to the more fashionable Southdown breed, which has now taken possession of nearly all, except the most barren and sandy districts of the county.†

IV. The *Wiltshire Breed* are distinguished by large spiral horns bending downwards, close to the head; they are perfectly white in their faces and legs; have long Roman noses, with large open nostrils; are wide and heavy in their hind quarters, and light in the fore-quarter and offal, but with little or no wool on their bellies. The quality of the fleece is that of clothing wool of moderate fineness, averaging nearly three pounds in weight; and the carcasses of the wethers, when fat, usually weigh from 70 lbs. to 90 lbs.: the mutton good: they sometimes, however, reach much higher, and may be considered as our largest breed of fine-woolled sheep.

The county of Wilts, being in great part composed of downland, the same necessity exists there, as upon other light soils, of maintaining large flocks of hardy constitutioned sheep for the purpose of folding; to which the old stock of the country was well adapted. But the improvements in the modern system of agriculture, by the introduction of green crops instead of fallows upon light land, having enabled the farmers to supply their flocks with better winter food than the bare pastures on which they were previously kept, the

* Evidence before a Committee of the House of Lords on the wool trade, in 1828. Printed report, p. 129.

† Agricultural Survey of Norfolk, by the Secretary to the Board; Kent's ditto; and Evidence of Mr. Fison before a Committee of the House of Lords, on the British wool trade, 1828, p. 194.

size of the present race has been increased, and the form has been improved by crossing. It is, however, said, that they have become less hardy, and worse nurses; and, in particular, so very nice in their food, that they will starve on the same kind of land where the former sort of smaller and more compact sheep lived well. Another serious consequence of the change is also said to have been produced by this delicacy of appetite—that by rejecting the feed of the downs, on which the chief dependence of the flock master rests, the herbage has gradually grown coarser; which evil has been further increased by the consequence of shortening the stock previously kept; it being a well known fact, that, to a certain extent, the closer the downs are fed, the more sheep they will support.* But it is more probable that the greatest injury done to the downs has been occasioned by the system, pursued during the high prices of corn, of breaking them up, and after exhausting them by repeated cropping, then laying them down with artificial grasses which soon wear out, and coarse natural grasses then take possession of the land, instead of the finer sward with which it had been previously covered.

It has been also found that the quality of the wool has been injured by the new system of feeding; and in this county, as well as in Norfolk, the native breed has been nearly superseded by that of the Southdowns.

V. The *Dorset Breed* have small horns with white faces and legs: the wool of the pure breed is of an intermediate kind, between long and short, and of middling fineness, weighing from three and a half to five pounds per fleece; and the carcass averaging eighteen pounds per quarter, of excellent mutton. But great numbers of Southdown sheep are bred in the county, and in many instances the blacks have been intermixed, and the character of the original stock proportionably altered. They are a hardy race, being chiefly bred on open downs, and inured to the fold; but their principal value consists in the peculiar forwardness of the ewes, which take the ram at a much earlier period than any other species, and are therefore much sought for, and command high prices for the purpose of producing house-lamb for winter consumption.

The Dorset sheep are chiefly to be found in the county from which they take their name, and in the neighboring borders of Devonshire; but a variety of the same breed occurs in *Dean Forest*, and on the *Mendip Hills*—a small compact animal, that will thrive on the poorest soil and fatten on such land as will scarcely keep other sorts alive. Pasturage ever so dry and exposed will feed this kind: they are very hardy; their wool fine; and the mutton is also excellent for the table, being full of gravy and of a rich flavor.† The Mendip Breed resembles, in many points, the merinos; and there is a tradition that the original stock of the Spanish fine-woolled sheep was obtained either from those hills or from those of Cotswold, in Gloucestershire; but the breed now prevailing in the latter district bears no likeness to them.

The *Polled Sheep* may be divided into two classes—the *long*, and the *short-woolled*—the peculiar merits of which have for many years formed a subject of discussion among agriculturists. Each has valuable properties, and efforts have been made to blend them, by crosses, but hitherto without complete success: nature seems to have intended them for different soils, and the short-woolled breeds, which thrive upon the bleakest hills, degenerate when removed into rich pastures, which are alone capable of maintaining the long-woolled species.

VI. The *Leicester* sheep take the lead among the *long-woolled kind;* and of these there are three nearly distinct species:—

1. The *Forest Sheep*, which, though not confined to the open district of Charnwood Forest, were probably the common field stock and original breed of the county. They are mostly polled, though some have small horns; are generally white, but sometimes gray-faced, with legs of the same color; are covered with coarse combing wool; and are altogether an inferior race.

2. The *Old Leicester*, which are probably descended either from the still more ancient stock of Charnwood, improved by better feeding, and by crosses with rams from the rich pastures of Lincolnshire; or from a large-boned, coarse-woolled breed, long common to the midland counties. They are large, heavy, flat-sided, strong in the bone, and somewhat coarse in the offal and pelt; but full of wool of a combing quality. They are well adapted for the rich, deep, feeding soils, upon which weight of mutton and of wool are more material objects for profit than fineness of quality; and, on such lands, the rams are commonly brought to weigh forty pounds the quarter, with a fleece of twelve to fourteen pounds.

3. The *New Leicester*, or *Dishley Breed* are an improved kind of the old species. Their forms are handsome; color white. Their heads are clean and small, their necks short, and their breasts full; their bodies are round, with broad, straight backs, but the bellies rather light, or tucked up; their legs and the whole bone are fine, and particularly small in proportion to their size; their pelts thin, and the wool long and fine of its kind, generally averaging seven pounds to the fleece. They are of a quiet disposition, fatten early and kindly, and are capable of being brought to a great weight, on a smaller proportion of food than other breeds of the same size, the fat wethers generally weighing (when shear-hogs) twenty-five pounds per quarter, and the ewes twenty-two pounds: the flesh is fine grained and well flavored, but too fat to please most palates.

The final improvement of this breed is unquestionably due to the late Mr. Bakewell; but there are various opinions respecting its origin. Mr. Marshall attributes it to one Joseph Allom, of Clifton, in Leicestershire, who, from being a plough-boy, raised himself by industry to the situation of an eminent farmer, and was the first who distinguished himself, in the midland district, by the possession of a superior breed of sheep. He was known to purchase his ewes at a distance, and it has since been ascertained that he chiefly obtained them in the Melton quarter of the county; but, in whatever manner he raised his breed, it appears certain that it was in high estimation before Mr. Bakewell's time, as it was customary for the most careful breeders to resort to Clifton for

* Agricultural Survey of Wilts, p. 142.

† See the Agricultural Survey of Somersetshire, 3d edit. p. 145.

ram-lambs, for which they gave the then extraordinary price of two and three guineas each: it has, therefore, been not improperly conjectured, by Mr. Marshall, that through the means of Mr. Allom's stock, the breed had passed the first stage of improvement before Mr. Bakewell's day.*

Another author† acquaints us—upon the authority of a gentleman long resident in the county—that about the year 1747 there was a succession of bad seasons, which occasioned a great rot in the sheep upon the clay-lands, that in a short space swept away whole flocks. Some of the small farmers were ruined; but the more opulent and enterprising resorted to the high grounds near Fridaythorpe, in Yorkshire, where they purchased some small neat sheep, which, crossed with the few that remained in their own fields, produced some very useful animals. As the numbers bred for a long time afterwards were not equal to the demand, they sent year after year to the same market: jobbers were established, who employed themselves in purchasing sheep on the Yorkshire wolds, for the use of the Leicestershire graziers; and, it is said, that Mr. Bakewell engaged these men not to offer their sheep to public sale till he had seen them, and had taken such as suited him. From these droves, or from the flocks so bred in his own neighborhood, and probably from a cross with the Lincolnshire, he bred his first short-legged, square-framed sheep, which were so well received that he went on breeding from his own stock, or crossing with any others that he judged most likely to attain the perfection at which he aimed; by which means, and partly, as it has been thought, by a cross with the Durham sheep, he by slow degrees produced the celebrated breed since distinguished by the name of the farm on which he resided. To him, therefore, may be justly conceded the merit of having effected this valuable improvement; but he has left many able disciples, who have followed closely in his steps, and have even so improved upon his system, that not only Leicestershire, but many of the neighboring counties, may now boast of possessing the breed in the highest perfection.

Many good judges are, however, of opinion, that the endeavors to improve the old breed have been carried too far, and that the introduction of the Dishley stock has reduced the quantity of mutton and wool in a much greater proportion of value, than it has improved the quality. It is admitted, that much good was effected by the early crosses, and that the New Leicesters feed quicker, and come sooner to market than the old; but they are deficient in inside fat, and are said to carry their flesh more upon the loin than in the leg; which are both serious faults in the eye of the butcher. It is also alleged, that too much value has been placed on fineness of bone, and that, in attaining that object, the constitution of the animal has been sacrificed; even, in many instances, to the destruction of the generative power in the ram.

VII. The *Lincolnshire Breed* so nearly resemble the old Leicester, that they require but little further description. They have white faces and legs, the bones large, and the carcass coarse; the back long and hollow, with flat ribs, but good loins, and a deep belly; forward loose shoulders, a heavy head, with a large neck, and sinking dewlap; the hind-quarter broad, the legs standing wide apart, and a large dock. The pelt is particularly thick, and the fleece consists of very long combing wool, of a rather coarse quality, but weighing generally from twelve to fourteen pounds on the wethers, and from eight to ten pounds on the ewes. The flesh is open-grained, and inferior to the mutton of the New Leicester, and particularly to that of the small, short-woolled breeds; it is besides subject to be yellow, which is a great defect at market, but it frequently reaches the weight of thirty-five pounds per quarter; and fat wethers generally average twenty-five.* This description, however, applies rather to the old breed of Lincolns, as well as of Leicesters, than to the sheep now commonly ranked under those denominations; for, owing to a judicious intermixture, not carried too far, of the Dishley blood, many of their imperfections have been rectified, while they still retain the valuable properties, so essential on rich soils, of great weight of fleece and carcass, and have further acquired some of the distinguishing marks of the improved breed, in the increased cleanness of the head, straightness of the back, and general symmetry.

VIII. The *Teeswater Breed*, another variety of the old long-woolled species, was formerly the stock of the northern part of the Vale of York, and of Cleveland; but it has, of late years, undergone so great a change, by crosses with Dishley rams, and their descendants, which were introduced into the north, by Messrs. Culley, about the year 1766, that the original race is now but rarely to be met with.

In their pure state, the Teeswater sheep are very large, coarse-boned, slow-feeders, and their wool is dry and harsh; but they arrive at greater weight than any other breed in the kingdom; the three year old wethers reaching to upwards of thirty pounds per quarter,† and producing a fleece of about eleven pounds. The ewes are singularly productive of lambs, twins being not only common, but three, and even four, being sometimes produced at a birth.

A variety of this race, which formerly occupied the lower district of Northumberland, were called *Mugs*, probably, as the surveyors of that county suggest, "from their faces being covered with a muff of wool, close to their eyes:"‡ but they have

* Rural Economy of the Midland Counties, 2d edit. Vol. I. p. 338.

† Mr. Pitt, of Wolverhampton. Agricultural Survey of Leicestershire, p. 249.

* Agricultural Survey of Lincolnshire, 2d edit. p. 403.

† A four shear sheep of this kind, bred by Mr. Thomas Hutchinson, of Sockburn, and killed at Darlington, in December, 1777, weighed 62 pounds per quarter; and another, belonging to Mr. Dinsdale, of Newsham, weighed 54 pounds. A wether, rising three years old, bred by Mr. Powley, of Thorndon-Stavard, and killed in January, 1799, weighed 59 pounds per quarter; and a lamb, five months old, bred by Mr. Henry Hutchinson, weighed 22 pounds per quarter. See Agricultural Survey of Durham, p. 248; and Agricultural Survey of Yorkshire, North Riding, p. 260.

‡ Agricultural Survey of Northumberland, by Messrs. J. Bailey, and G. Cullep, 3d edit. p. 150.

given way to the Dishley breed, or have been so improved by crosses, as to retain but little of their original appearance.

The value of this species of stock may be in a great degree estimated by its aptitude to increase in flesh at an early age, and when no particular means of fatting are used; of which the following account of four, fed by Mr. Mason, of Chilton, affords a fair specimen:—

Lambs. Wt. Aug. 15, 1803.	Shearlings. Wt. 4 Oct. 1804.	Gain	Two Shear. Gained to 15 Oct. 1805.
lbs.	lbs.	lbs.	lbs.
92	202	110	34
82	193	111	38
87	216	129	32
91	199	108	28
352	810	458	132
88	202½	114½	33

Thus, the weight gained from five months to one year and seven months old, is 114½ lbs., or at the rate of 1 lb. 15 oz. per week; but from that age to two years and seven months old, the gain in weight is only 33 lbs., or 10 oz. per week.*

IX. The *Romney Marsh* sheep have existed immemorially on that rich tract of grazing land, on the southern coast of the counties of Kent and Sussex, from which they take their name. In their pure state, they are distinguished by white faces, a considerable thickness and length of head, and a broad forehead, with a tuft of wool upon it; a long and thin neck, and flat-sided carcass. They are wide on the loin, but have a sharp chine, and the breast is narrow, and not deep; the belly large; a good cleft; the thigh full and broad, carrying the chief weight in the hind quarter; the tail thick, long, and coarse; the legs thick, with large feet, the muscle coarse, and the bone large. The wool is a good combing quality, the fleece of fattening wethers weighing from eight to nine pounds; the mutton is equal to that of any of the large polled breeds, and their proof being good, they are favorites with the butchers. When fat, the wethers usually average from ten to twelve stone each, and the ewes from nine to eleven.† They are very hardy; are bred with little care, on wet and exposed land, requiring, after the first year, when they are wintered on the uplands, no other food in the severest situation, than occasionally a little hay, in addition to their pasture; and are fattened entirely on grass.

Within these few years, the fashionable Leicester breed has been introduced into Romney Marsh, and the cross has, no doubt, improved the form of the native sheep; but its effect, in the opinion of a very competent judge,‡ "has evidently been that of reducing the size of the animals, and making the wool coarser, but giving them a better disposition to fatten." The rage for Leicester sheep seems, however, to have subsided among the marsh graziers, and the ram breeders are now anxious to make it appear, that their stock is unmixed with the Dishley blood; though, in truth, there are but few, if any, flocks without at least a remote dash of it. Besides the diminution of weight of carcass, and the deterioration of the fleece, the Leicester breed has been found too tender for the cold and open pastures of the marsh. The breeders complain that they suffer great losses from the delicacy of the lambs, and the ewes are found neither to produce so well, nor to be such good nurses as those of the original race; but the improved disposition to fatten must be allowed to be of great advantage. Mr. Price, who has been already quoted, informs us, "that, at no very distant period, the wethers seldom reached market till three years old, but now two years old wethers, and sometimes even yearlings, are sold to the butchers;" and he adds, as his opinion, "that this variety may be made the most valuable in the kingdom for rich pastures, as producing most meat at the least expense, and thus afford the grazier the greatest profit."

X. The *Devonshire* polled sheep form two distinct varieties of the same breed:—

1. The *South Devon* or *dim-faced Nott*, with brown face and legs; a crooked backed, flat-sided, coarsely boned and woolled animal, carrying a fleece of ten pounds average weight, and averaging 22 lbs. per quarter of good mutton, at thirty months old.

2. The *Bampton Nott*, with white face and legs, though in other respects nearly resembling the former in appearance; but the wethers will, at twenty months old, average as much weight of carcass as the others at thirty, and, if kept on for another year, will reach, when fat, as much as 28 lbs. per quarter. They are not, however, equally productive of wool; for, at the first period, they only yield about 6½ lbs., and at the latter, 8 lbs.

Considerable improvement has been effected in the form of these sheep, as well as in most other of the long-woolled breeds, by crosses with the *new* Leicesters, and a greater aptitude has been acquired to fatten at an earlier period; but while many of their defects have been thus cured, the same complaints are made, as in the other instances already noticed, of increased tenderness in the lambs, which are found to require extraordinary care and nursing, yet often perish through the severity of the weather: also of a very material diminution in the weight both of the fleece and carcass; the former being reduced from ten pounds to eight, and the latter from twenty-two pounds to nineteen pounds per quarter. They are likewise bare of wool upon the belly, which occasions great injury to animals constantly lying out, and much exposed to wet; none of which disadvantages have attended a cross with the *old* Leicester, which has, on the contrary, increased the weight of flesh, as well as the disposition to fatten.*

Another variety of long-woolled sheep is found on the *Cotswold Hills*, to which most of the remarks already made on the Devon breeds will equally apply.

The chief of the *short-woolled* breeds are—

* Durham Agricultural Survey, p. 253.

† Price, on the Management of Sheep in Romney Marsh, 4to. Ch. II. p. 109.

‡ Mr. Boys, of Betshanger. Agricultural Survey of Kent, 2d edit. p. 174.

* Vancouver, Agricultural Survey of Devonshire, Chap. XIV. Sect. 2.

XI. The *Southdown*, of which the specific characters are—faces and legs gray; bones fine; head clean; neck long and small; low before; shoulder wide; light in the fore quarter; sides and chest deep; loin broad; back bone rather too high; thigh full, and twist good; wool very fine and short, (the staple being from two to three inches in length,) weighing an average of three pounds and a half per fleece, when killed at two years old. Flesh fine grained, and of excellent flavor; quick feeders; constitution hardy and vigorous. They are round in the general appearance of the barrel; and, from standing wide on their hind legs, and being shut well in the twist, the leg of down mutton is remarkably round and short, not only cutting handsomely for the table, but weighing heavier than common in proportion to the fore quarter—which are material advantages to the butcher, as they command a ready sale, at an advance of a penny per pound over the other joints. Fat wethers usually average about 18 lbs. per quarter; but this has been, in many instances, increased by late attempts to improve the size of the carcass. Whether these have been judicious, time alone can determine; but it does appear from the evidence of some of the persons examined before a select committee of the House of Lords, appointed in 1828, to take into consideration the state of the British wool trade, that they have injured the quality of the fleece.* This has, indeed, been denied by the breeders; but in all other instances, it has been uniformly found that efforts to increase the flesh have been attended with similar effects. In the present state of the wool trade, this may, however, be of less consequence than it might have been some years ago, for it appears from all the concurrent evidence produced before that committee, that the British carding, or short clothing wools, have been entirely superseded in our manufactories, by the German and other foreign kinds. But too great an increase of carcass may also injure the quality of the mutton, which is now of the very finest kind.

These sheep have been bred for ages past on the chalky soils of the Southdowns, in Sussex, and on such short pasture, and in such exposed situations, they are perhaps the most valuable breed in the kingdom; but they are spreading fast not only into similar districts, but into counties better calculated for long-woolled and larger sheep. That the breed will, on those rich soils, degenerate in the superior properties of their flesh and wool, there can be little doubt; but it will still be matter of calculation, whether that disadvantage may not be more than balanced by superior weight. On their native downs, it will probably be found better to preserve them as near to their original size as possible: for, if too large for the constitution of the soil, it will be difficult, if not impossible, to maintain the increase of weight; or, if maintained, it probably will be with some loss either of the hardiness or activity requisite to their thriving on the land for which they are most appropriate; or with detriment to the qualities of the flesh and wool; and thus an apparent advantage may lead to serious future injury.

XII. The *Cannock Heath* sheep are bred upon an extensive waste, so named, in Staffordshire; they are very generally gray faced; without horns; bear fine wool; and from many points of similitude between them and the Southdown breed, it has been thought that they were originally derived from the same stock. The bone, however, is coarser; nor do they possess the same beauty and compactness as the downs; but these defects probably arise from inattention on the part of the former breeders, which the present flock-masters are making efforts to rectify; and, to counterbalance them, the carcass is heavier, and the mutton equally good.

XIII. The *Ryeland Breed* is so called from a district in the neighborhood of Ross in Herefordshire. They are small, white faced, and hornless; the wool growing close to their eyes; are light in the bone; have small, clean legs; and, when proper attention has been paid to the breeding stock, possess great compactness and symmetry. The ewes weigh from nine to twelve and fourteen pounds, and the wethers from twelve to sixteen pounds per quarter, when fatted, at three to four years old, and their flesh is equal to any mutton in the kingdom. The fleece does not average more than two pounds; but the quality of the wool is unrivalled by that of any of our native stock. They are patient of hunger, and no breed is supposed capable of subsisting on a smaller quantity of food; they are, therefore, adapted to the pasturage of down land; but they require a fine herbage, and are so tender as to require shelter in the winter; and particularly at the time of lambing. They are not, as many persons imagine, wholly a mountain breed, being kept in the vale lands as well as on the hills, and are often fatted on the same soil with the Hereford oxen.

A cross has been made between this breed and the Spanish sheep, the produce of which are termed *Merino Ryelands*, and the wool *Anglo Merino*. The first stage of the cross materially detracts from the beauty of the Ryeland's form; but the fleece is much improved both in weight and quality, and the carcass is increased, while the flavor of the mutton remains uninjured. It has been affirmed, that the characteristic properties of the Merino Ryelands correspond with those of the Spanish race as far as the fourth generation, and that the wool is nearly of equal quality to that of the pure merino. Great exertions were made by the late Dr. Parry, of Bath, and other spirited wool-growers to introduce them to general notice; but it appears, from the evidence produced before the Committee of the House of Lords, already mentioned, that this new breed has declined; and that, either from the general depreciation in the value of short wool, or, as some allege, from deterioration of the quality of this species, the anglo wool is now nearly unsaleable, though it still commands a higher price, when sold, than the finest pure British.*

* See the Evidence in the Printed Report, of Mr. C. Bull, of Lewes, Woolstapler; Mr. Sutcliffe, of Huddersfield, ditto; Mr. Brooke, of Honley, near Huddersfield, Cloth-manufacturer; Mr. G. Goodman, of Leeds, Wool-factor; and of Mr. Sheppard, of London, Blackwell-Hall factor, Chairman of the London Committee of the Woollen Trade.

* See the evidence of Mr. Cunnington, of Upavon, Wilts, Woolstapler; Mr. W. Ireland, of London, and Chalford, in Gloucestershire, Manufacturer; and of Mr. G. Webb Hall, of Sneed Park, Gloucestershire, Farmer.

Another cross has also been attempted between the pure Ryeland and the new Leicester breeds; but although the weight of the carcass has been thereby much increased, yet it can only be supported on land of a much richer kind than that on which the native sheep are usually fed, and it is probable, that if persevered in, on such soils, it would materially injure the mutton, while its immediate effect was certainly detrimental to the wool.*

In some of the neighboring counties to Herefordshire, both in England and Wales, there is a breed of sheep very much resembling the Ryelands, known as the *Shropshire morf.* They bear wool of a fine quality; generally have white faces and legs, though sometimes a little freckled; are light in the bone, and have small clean limbs. There are two species, which, from inattention to the breeds, are often blended. The one polled, the other having small, light, crooked horns—a still smaller variety, bred on the mountains, and in high estimation for the table; but which is generally known under the common denomination of *Welch.*

XIV. The *Cheviot Sheep* were originally bred upon the hilly districts in the north-west part of Northumberland, but have since spread over many of the mountainous tracts in the neighboring counties, and have even nearly superseded the horned breed of black-faced sheep in some parts of the Highlands of Scotland.† They are hornless, and their faces and legs are in general white, though formerly the prevailing color was black; some, however, still retain a portion of black about the nose; and others have the face slightly tinged with yellow. The best breeds have an open countenance, with lively prominent eyes; long bodies, and fine, clean, small-boned limbs, but wanting depth in the breast, and on the chine. They are seldom slaughtered until they have attained the age of three to four and a half years, when the fat wethers will average from 16 lbs. to 22 lbs. per quarter, and in some instances still higher, fattening kindly, and producing mutton of excellent quality. Formerly the average was much lower, not exceeding 12 lbs. to 18 lbs., and they were kept longer before they were brought to market; but great improvements have been made in this stock within the last twenty years. The weight of the fleece has also been increased in some of the best flocks from $2\frac{1}{2}$ to $3\frac{1}{2}$, to as much as 4 lbs. to $4\frac{1}{4}$ lbs.;‡ but the wool is inferior to that of most other of the short-woolled polled breeds, and appears to have been injured by some late attempts to improve the carcass.§ It is, also, further deteriorated in the eye of the woolstapler, by the practice of smearing, or *salving*, as it is termed, of the flocks pastured on the most elevated hills, with a mixture of oil or butter with tar and turpentine, in order to protect them against the inclemency of winter: this custom, however, is now nearly disused in the lowlands, though in many places it is yet thought advantageous to the fleece.*

The sheep known as the *Herdwick Breed,* though smaller than the Cheviot, and only found in one rocky and mountainous district at the head of the Duddon and Esk rivers, in Cumberland, appear to be only a variety of the same race. The wethers and ewes are all polled: their faces and legs are speckled; but a great portion of white with a few black spots are accounted marks of the purest breed; of which also the hornless are tups; for when these are found with horns, they are considered as descended from a cross with the common black-faced heath species, and their wool is then generally intermixed with *kemps,* or hairs.

They are a hardy breed, well adapted to seek their food amongst the rocks which they inhabit; which are in many places bare, and, where covered, the soil is thin, but the herbage mostly green, though heath is found on the summits. They have no hay in winter, but support themselves in the deepest snows by scratching down to the herbage, and should any part be blown bare, they are sure to discover it. In storms they gather together, and keep stirring about, by which means they tread down the snow, keep above it, and are rarely overblown. The lambs are protected by nature, being well covered with wool when they are dropped.

The ewes are kept as long as they will breed, which is often until ten and even fifteen years of age: the wethers go off at the same age as the old Cheviots. Both ewes and wethers are sold from the mountains, and killed without being put on any better pasture, yet are sufficiently fat, and the wethers will weigh about 10 lbs. to 12 lbs. a quarter: the ewes from 6 lbs. to 8 lbs. From being fed on heath and mountain plants, the flesh acquires a peculiarly fine flavor, when these are in blossom, from July till September, and is then esteemed a great delicacy; but, when out of season, the mutton is dry and indifferent.

The mountains on which these sheep are bred are the property of Lord Muncaster, who is also proprietor of the flocks that depasture them; and having, from time immemorial, been farmed out together to herds, it is thought that, from this circumstance, the farms have obtained the name of *Herdwicks,* or the district of the herds; from which the sheep have also received their title. They are chiefly in the hands of one family, of the name of Tyson, which is said to have been settled in that sequestered spot above four hundred years.†

Another variety, termed the *Dun-faced breed,* is found in the exposed northern districts of this island. The faces of the sheep are of a dun, or tawny color: the animals are smaller in size; have short tails; and are not so hardy as the preceding sort. The wool is variously streaked with black, red, brown, or dun, and partly of a fine texture, weighing about a pound and a half per fleece,

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* Agricultural Survey of Herefordshire, p. 121.

† See the evidence of the Right Hon. Lord Napier, before the Committee of the House of Lords, on the Wool Trade, 1828. Minutes, p. 15.

‡ See Farm Report for the County of Sutherland, published by the Society for the Diffusion of Useful Knowledge, in the "Farmer's Series," for 1831, No. 18.

§ See the evidence of Mr. Sutcliffe, Minutes, p. 183.

* 12 lbs. of butter mixed with 4 lbs. of tar, are used for the salving of twenty-four sheep: the expense about sixpence each.

† Agricultural Survey of Cumberland, Chap. XIII, Sect. 11.

when killed at four years and a half. Flesh finely grained, and of excellent flavor.

The *Shetland Breed,* a nearly similar race, derives its name from the islands on the north coast of Scotland, where these sheep are reared. The wool is very fine and soft, fit for the finest manufactures: the fleece weighs upon an average from one to three pounds. The Shetland sheep are very hardy, but too wild to be confined. There are two varieties of this breed; the *first* of which has very coarse wool above, and fine wool below, being supplied with long hairs termed *fors* and *scudda,* which protect the animals from the intense cold of winter; the *second* variety has soft, cottony fleeces, and is less hardy than the preceding variety, the wool being short and open: the weight of the wether carcass of either does not average more than 8 lbs. per quarter.

The *Isle of Man* possesses a breed of apparently the same parentage, but partly horned as well as polled: their general color is white, but many are gray, and a few of a peculiar brown color, provincially termed *Laughton.* In the whole breed one distinctive mark is said to appear in a Laughton-colored patch on the back of the neck; and it is somewhat singular that a similar mark has been observed on sheep from the island of Iceland, which are, indeed, said to bear a general resemblance to the Manks breed. It is observed, that sheep of the Laughton color are more tender and slower feeders than the others; but their wool is peculiarly soft, and is held in high estimation for the manufacture of stockings. The mutton of each sort is excellent; but in other respects the breed is little deserving of attention. They are of mean appearance, with high backs and narrow ribs; slow feeders, and long in coming to maturity. Many attemps have been made to improve them by crosses with Leicester, Southdown, pure Merino, and Ryeland Merino rams. These have in some degree succeeded, and in particular the cross between the Southdown and the Manks is said to be little inferior to the male parent; that with the Ryeland Merino having been judiciously made with some of the finest woolled ewes, has greatly improved the fleece; but it is admitted that these half-bred Manks Merinos are not good feeders.*

* Agricultural Survey of the Isle of Man, Chap. XIV. Sect. 11.

QUERIES AND DESULTORY OBSERVATIONS ON MANURING, &c.

To the Editor of the Farmers' Register.

In a late No. of the Register it is said that land originally poor can never be brought to a higher state of fertility unless calcareous manures are used—or to that effect. Now as your reasoning appears to me to be conclusive, as to the fact, it is my wish to test it by an experiment. I have about three acres of land, just cleared, of rather inferior quality. It is pretty well covered with litter, leaves, and coarse grasses, which have sprung up in consequence of the land having been partially cleared for several years. It is my purpose to put the land in tobacco the next year. As I cannot get marl, I intend to use lime, and wish you to be good enough to say in the Register, whether it must be used before grubbing and coultering, or not? whether before or after the trash is removed —and what quantity of slaked lime to the acre will be sufficient to *begin* with? and when to be repeated, &c. &c.*

Would it not be well to urge (through the Register) upon the friends of the enclosing system, the propriety of meeting in convention, through representatives from all the counties below the ridge, in order to prepare and present a joint memorial to the legislature, for amendments of the law of enclosures? The prosperity of our poor old state depends, in my judgement, more upon this measure, than upon any other, or all others—whether they consist of internal improvements by rail roads, canals, turnpikes, improvements of the channels of rivers, locks and dams, or any thing else the wisdom of the legislature may think proper to devise. The plan for enclosing our stock, instead of enclosing our crops, extends its benefits to every individual in the state, and, with peculiar certainty, to the *poor non-land-holder;* whereas, those systems which give facility to our intercourse, apply mainly to the wealthy—having a tendency to make the rich richer. Do not understand me to be an enemy to any system of internal improvement. I only mean to place the one under consideration above all others, as the benefits to arise from it are general.

In a small way I have been a very successful corn raiser; and I have ascribed my success principally, to my planting corn much *thicker* or closer together than my neighbors are in the habit of doing. My rule is, where the land has sufficient strength, under good cultivation, to produce as much as five barrels to the acre—to throw the land into ten feet beds—lay off two rows on a bed, the row next to the bed furrow to be six, and the other four feet wide. The corn is dropped three feet a part, and thinned to two stalks in a place. This gives seven and a half square feet of land to every stalk. This rule applies to the large soft corn of the south. If I plant small flinty corn on similar land, I reduce the number of square feet to six for every stalk. If the land is capable of bringing ten barrels to the acre, I would reduce the number of feet to each stalk nearly one-half: and on the other hand, if compelled to cultivate poorer land in corn, I would increase the number of square feet in similar proportions. I usually run the new ground coulter next to the corn as early as possi-

*Our personal experience of the use of *quick* or *caustic* lime is very limited, and the views which we entertain, as to the manure in that state, are more theoretical than practical. They have been expressed more fully in Chap. 8, of Essay on Calcareous Manures. Newly cleared land would probably receive, without damage, a heavier dressing of quicklime than most other arable soils. Still we should fear to give more than 150 bushels of slaked lime—though three or four times that quantity, if mild, (as in marl,) might be applied to such land, safely and advantageously. In either case, the best time to apply the lime, or other calcareous manure, would be before removing the leaves and litter—which indeed should not be moved at all, if the main object is the improvement of the soil. How far leaving the litter would be opposed to the first crop proposed, tobacco, is a different question.—Ed.

ble, and use the mould-board plough, or not, according to the progress of the weeds and grass in the after cultivation. My opinion is, whenever corn requires ploughing, it requires *deep* ploughing, unless it is when the corn has been planted upon a recently well turned turf—*that*, I think, should never be disturbed by after deep cultivation. Simply keep the land clean by shallow culture.

I have been in the habit of using leaves and straw, and coarse manure, for the corn crop, in the following manner, with great benefit: plough the land in nine feet beds—or rather open deep furrows nine feet apart, in the fall or winter—fill them with straw, leaves, or coarse manure—throw back the earth immediately, and when you have finished, break the land at your leisure—in beds of course—and plant the corn in rows only three feet wide, in the centre of the nine feet bed—that is, eighteen inches from the centre of the rubbish row. You will then have a six and a three feet row to each bed, giving the corn distance according to the supposed strength of the land. In cultivating the crop, the three feet row is simply to be kept clean with the hoe or skimmer, the leaves, &c. to remain undisturbed in the process of cultivation. The six feet row to be ploughed as deep as possible, but not with a mould-board plough if the land is very poor.

When you give directions to plain farmers about improving their lands, it would be well to use the simplest terms, and such as the very ignorant are accustomed to use among themselves. Say for instance, "gray land" with a "red or yellow foundation" may be improved by such and such means—omit the terms "alluvial"—"loam," &c. &c.; and in all other respects adapt your terms to the meanest capacity, if possible. The wise will understand you quite as well, and the ignorant will be delighted, and soon begin to prefer the Register to all other publications. When it is absolutely necessary to use scientific terms, define them, for there are few clod-hoppers who have dictionaries, and many that don't know "how to look for words in them."*

When you allude to *our* now universal practice of top-dressing with *well rotted manure*, you generally use the term "*this novel practice.*" Some think you mean, thereby, to deride the practice. My own experience does not warrant me in saying the improvement is as permanent as the old method of turning in the manure—but I will state a fact in relation to an experiment made by a friend of mine, to which my attention has been repeatedly called. Five years ago last fall, this friend had a lot of ten acres which he was desirous of getting in clover as soon as possible. He thought he had a sufficiency of manure (well rotted farmpen) to make the whole ten acres rich. He commenced hauling, spreading, and ploughing in the manure, at the rate of *forty thirty-bushel loads* to the acre, *upon four acres of the best part of the lot*. After proceeding this far, he discovered that his manure would not hold out, at *that rate*, to complete the lot; he therefore determined to plough the land—sow the wheat, and reserve the balance of the manure for top-dressing. In the succeeding winter he proceeded to complete his work—sowed the land in clover, and top-dressed the remainder of the lot at the rate of *twelve loads* to the acre. The succeeding wheat crop on this part of the lot was equal to the other—the clover crop was better. There has been one wheat crop on the land since, which was equally good throughout—and as far as can be judged by the eye, the lot is now about equal in fertility in all its parts. This experiment has satisfied me as to the permanence of "this novel practice of manuring land."

I will call your attention to one circumstance, which in my judgement, goes, measurably, to the refutation of your idea, "that land originally poor can never be rendered more fertile, or raised above its original fertility without the use of calcareous manure." You have no doubt frequently remarked the *abiding* fertility of an acre or two of land where old settlements had been broken up and the land put in cultivation, while the adjacent lands evinced *original* poverty of soil. This is certainly the case *here*, where we have neither lime, nor marl, nor oyster-shells. Admitting the fact, what is the conclusion? Perhaps you will ascribe it to the caustic quality of the ashes that have been thrown out for fifty years. But you know that ash heaps frequently lie undisturbed for ten or fifteen years; and such is the ignorance respecting

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*We take this advice in good part, but claim that we have always endeavored to use terms as plain as possible. But while agreeing entirely in this respect with our correspondent, as to proper *ends*, we differ altogether as to the *means* by which to reach them. We think that to render agricultural terms as plain as possible, it is necessary that they should be *correct*—and that if correct terms are substituted by the provincialisms of a particular district, the terms would become plain to that district only by being made obscure to all others. We can assure our correspondent that even the meaning of "gray land" would be unintelligible to half the farming world, and that the term is not known in some counties within ninety miles of Goochland, except to those persons who have heard its use abroad. We differ as to another mean for reaching the end, *plainness*, which we both claim to approve and to seek. Certainly terms purely scientific, or technical, ought to be explained, at least often enough for every attentive reader of the work in which they are used, to learn the definitions. But if such terms as "loam," "alluvial" &c. are meant as requiring to be always defined—or even if scientific terms are to be explained every time they are used, the style of many communications would necessarily be something of the fashion of the account of "The House that Jack built," and the end and meaning would scarcely be sought by any reader among the mass of explanatory accompaniments. In short, the reader who expects every piece to serve as its own dictionary, and who will not ask or seek for explanation of a difficulty, would scarcely profit by any facilities that could be afforded. The next paragraph furnishes an example of the extent to which definitions would be required, if it is necessary to explain that when we spoke of top-dressing wheat as a "novel" practice, we neither meant to deride, nor to oppose it: but on the contrary, consider it as one of the most valuable improvements made known through the Farmers' Register.—Ed.

their value, they are rarely distributed at all by small house-keepers. My conclusion on the subject is this—that those lands about the old settlements having been top-dressed for forty or fifty years, become permanently rich in consequence thereof. This is a very *novel* idea, and perhaps you will think it a very silly one: at any rate, I think it probable that top-dressing will become the universal mode of manuring land.*

Permit me to call your attention to a method of pulverizing fresh ploughed lands by the use of a drag-log, described in a late No. of the Genesee Farmer, by a friend of ours. I have used it for eighteen months, and think that one rubbing is worth a dozen harrowings for the purpose of rendering fresh ploughed land fine and mellow.†

T. W. P.

Goochland, June 10th, 1835.

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*The well known fact stated above of the permanent fertility exhibited on the sites of old dwelling places on naturally poor land, instead of opposing the opinion referred to by our correspondent, is in truth, one of its strongest supports—and we have often claimed its aid in argument, for that purpose. It is not the "caustic" quality of the ashes which produces the benefit, but the calcareous earth they contain, amounting to perhaps, half their bulk—and to the phosphate of lime, which forms part of the balance. This substance constitutes the most solid part of bones. But independent of this portion of phosphate of lime, and of that in all the bones left near the residence of a family, the calcareous earth alone from the ashes, and other sources, would be amply sufficient to fix the permanent fertility always seen on such spots. The other sources of lime are almost every thing brought to and consumed at the residence of a family: for, every article of food and clothing, as well as fuel, contains some lime—all the offal of crops, &c., and therefore the proportion of lime at and near a dwelling place must be always increasing, because more is brought to it than is carried away.—ED.

†The communication referred to has already been published in this journal, page 751, vol. II.—ED.

From the Library of Useful Knowledge—Farmer's Series.

ORIGIN AND VALUE OF THE IMPROVED SHORT-HORNED BREED OF CATTLE.

For every portion of the text in this excellent account of the short-horns, we are indebted to the Rev. Henry Berry, than whom there are few more zealous breeders of cattle, while there is no better judge of them.

Whatsoever differences of opinion may prevail respecting the comparative merits of our several breeds of cattle, it must be admitted that the short-horns present themselves to notice under circumstances of peculiar interest. Possessing in an eminent degree a combination of qualities which have generally been considered incompatible, and rendered irresistibly attractive to the eye by their splendid frames, and varied colors, it is not surprising that they have become objects of public curiosity; that they have realized for their breeders enormous sums of money; and that throughout our own island, and in every foreign country where agriculture is attended to, they are in increasing request.

It might tend to throw much light on the science of breeding, could these animals be traced, in the progress of their improvement, to an earlier period than has hitherto been found possible. Of the extent of that improvement, we may, however, form an estimate, by placing together one of the improved, and one of the unimproved race. We should, in such case, discover resemblance just sufficient to support the belief in a very remote alliance, but there all similarity would cease.

From the earliest periods as to which we have any accounts of our breeds of cattle, the counties of Durham and York have been celebrated for their short-horns, but principally, in the first instance, on account of their reputation as extraordinary milkers.* To recite their feats at the pail would be to invite incredulity; but it may be asserted, on the best evidence, that, taken as a breed, they have never, in this particular, been equalled. The cattle so distinguished were always, as now, very different from the improved race.

They were generally of large size, thin skinned, sleek haired, bad handlers, rather delicate in constitution, coarse in the offal, and strikingly defective in the substance of the girth in the fore-quarters. As milkers, they were most excellent, but when put to fatten, as the foregoing description will indicate, were found slow feeders, producing an inferior quality of meat, not marbled or mixed as to fat and lean, and in some cases, the latter was found of a particular dark hue. Such, also, are the unimproved short-horns of the present day, and the distinction cannot be too frequently asserted, because they are, in many cases, considered as specimens of the improved breed, and have actually been resorted to in trials as to the comparative aptitude of animals to fatten—trials which is evident they could not successfully sustain.

A period of more than eighty years has now elapsed since the short-horns on the banks of the river Tees, (hence called the Teeswater breed,) had assumed a very different character to that

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* Before this, a large and valuable description of cattle had existed on the western coast of the continent of Europe, and extended from Denmark to the confines of France. They were celebrated for the great quantities of milk which they yielded, and some of them exhibited an extraordinary aptitude to fatten. At what particular time they found their way to England, or by whom they were imported, is unknown; but there is a tradition, that, towards the close of the seventeenth century, a bull and some cows were introduced into Holderness.

In external form, there appeard to be very little to recommend them, for they had large shoulders and coarse necks, the sides were flat, and the head was thick; all the coarse parts were bulky and the prime ones were reduced in size, and they were almost the reverse of what the agriculturist would select: they were, however, bulkier than the native breeds, and they were better milkers than the generality of the cattle of that day. They would, by dint of feeding, grow to an enormous size, but they had not the aptitude to fatten, nor the early maturity, to which they have been since indebted for their triumph over every other breed.—*Farmer and Gardener.*

contained in the foregoing description. In color they resemble the improved short-horns, being occasionally red, red and white, and roan, though the last named color was not then so prevalent as now. They possessed a fine mellow skin and flesh, good hair, and light offal, particularly wide carcasses, and fore-quarters of extraordinary depth and capacity. Perhaps no closer modern resemblance can be found to the above description of the Teeswater breed than Mr. Berry's bull presents. His dam was purchased by Mr. B. on account of the very few crosses that intervened between her and some of the best Teeswater cattle, to which he was desirous to go back, on account of the extent to which breeding *in and in* has been carried. When slaughtered, their proof was extraordinary, and many instances are recorded of the wonderful weight of their inside fat.

The remarkable difference which existed between the Teeswater and the old unimproved short-horns, may, with propriety, be ascribed to a spirit of improvement which had sometimes manifested itself among the breeders on the banks of the Tees, whose laudable efforts were well seconded by the very superior land in the vicinity of that river. No reasonable doubts can be entertained that they proceeded on a judicious system of crossing with other breeds, because it was utterly impossible to raise such a stock as the Teeswater from pure short-horn blood. One cross to which they referred was, in all probability, the white wild breed; and it this conjecture be well founded, it will be apparent whence the short-horns derived a color so prevalent among them.

It is also asserted that, about the period in question, Sir William St. Quintin, of Scampston, imported bulls and cows from Holland, which were crossed with the stock of the country. It would tend to little advantage to proceed with conjectures, as to what other breeds were resorted to, if any; this much is certain, that great improvement was soon manifested, and a valuable variety established, as the two following instances will prove.

Mr. Millbank, of Barmingham, one of the leading improvers, bred and slaughtered an ox, which, at five years old, weighed four quarters, one hundred and fifty stones, of fourteen pounds to the stone, producing sixteen stones of tallow; and a cow bred from his stock, slaughtered by Mr. Sharter, of Chilton, at twelve years old, weighed upwards of one hundred and ten stones.

From Mr. Millbank's time, the Teeswater cattle continued to sustain their excellence and celebrity in various hands, until Mr. Charles Colling adopted them, when he manifested a superiority of skill as a breeder, which, in a very brief period, secured him an ample fortune.

Whatever has been the merits of the Teeswater cattle, it is certain Mr. Colling greatly improved them; and though it has been asserted that his success was the result of chance, arising from the possession of an animal, with the merits of which, it is supposed, he was at one period unacquainted, the writer of this article is of opinion that Mr. Colling's success resulted from a deliberate and well considered plan. He found the Teeswater, like all other extravagantly large cattle, frequently of loose make and disproportion. He was sensible, also, of the difficulty of breeding, with any thing like certainty, *large good* animals, and though he has declined on all occasions to throw any light on his views and proceedings, the writer thinks he can detect, in the very outset, and through the progress of his practice, a resolution to reduce the size of this breed, and at the same time, and by that means, to improve its form. This he is supposed to have effected, in the first instance, through the medium of a bull called "*Hubback*," an animal respecting which there has been much controversy, principally touching the purity of his blood, a question now of little importance, because it is admitted on all hands that Mr. Colling adopted another cross, which prevails in a majority of superior short-horns of the present day. It may, notwithstanding, be a matter of interest to state a few particulars respecting this bull.

Without entering on an inquiry by what circumstances Hubback's title to be considered of pure blood is supported or weakened, it may suffice to observe, that it appears probable he possessed on one side the imported blood. The possessor of his dam was a person in indigent circumstances, and grazed his cow in the highways. When afterwards she was removed to good land, near Darlington, she became so fat that she did not again breed; and her son, having the same feeding propensity in a high degree, was useful as a bull during a very short period. The quality of his flesh, hide, and hair, are supposed to have been seldom equalled: and as he was smaller than the Teeswater cattle, he was eminently calculated to forward Mr. Colling's views.

It has been remarked that we have at present no superior horse on the turf, which does not boast the blood of the Godolphin Arabian; so it may be asserted that we have no superior short-horns which do not claim descent nearly, or remotely, from Hubback.*

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* This is true, because Hubback was the sire of the dam of Mr. Charles Colling's bull, Foljambe, who was the grandsire of Favorite; and there can be no doubt that there has not been for many years any superior short-horn who was not descended from Favorite. Mr. Charles Colling is said to have considered that the bull Foljambe, was the one that did his stock the greatest good; and this is not improbable, as Foljambe was the sire both of the sire and dam of Favorite. Hubback, however, must have been a remarkable good animal; and considering the short time during which he was used as a bull, proved himself a first rate stock getter. The following account of Hubback we had from Mr. Waistell, of Allhill, who, although his name does not appear conspicuously in the "Short Horned Herd Book," deserves much credit for his discrimination here. He used to admire this calf as he rode almost daily by the meadow in which it grazed; and at length he attempted to purchase it from the owner. The price asked, £8, seemed much for a calf not a year old and the reputation of the short-horns not being yet established, the bargain was not struck. Still he longed for the young beast· and happening to meet Mr. Robert Colling near the place, he asked his opinion of the animal. Mr. Colling acknowledged that there were some good points about him; but there was something in his manner of acknowledging this, which induced Mr. Waistell to suspect that Mr. Colling thought somewhat more highly of the calf than his language expressed, and therefore, he hastened the next morning, concluded the bargain, and paid the money. He had scarcely done so before Mr. Robert Colling arrived for the same purpose, and as the two farmers

After the use of this bull, Mr. Charles Colling proceeded with singular success to produce, from time to time, superior animals; and the number of bulls he disposed of by letting was highly encouraging. But the circumstance which brought the improved short-horns into most extensive notice, was, the production of the "Durham ox," an animal which speaks volumes in favor of even a single cross of this blood: for the ox was the produce of a common cow, which had been put to "*Favorite*." At five years old, the Durham ox was sold to Mr. Bulmer, of Harmby, near Bedale, for public exhibition, at the price of £140: this was in February, 1801. He was at that time computed to weigh 168 stones, of 14 lbs., his live weight being 216 stones; and this extraordinary weight did not arise from his superior size, but from the excessive ripeness of his points. Mr. Bulmer having obtained a carriage for his conveyance, travelled with him five weeks, and then sold him and the carriage, at Rotherham, to Mr. John Day, on the 14th of May, 1801, for £250.

On the 14th of May, Mr. Day could have sold him for	- -	£525
On the 13th of June for	-	1000
On the 18th of June for	-	2000

Mr. Day travelled with him nearly six years, through the principal parts of England and Scotland, till at Oxford, on the 19th February, 1807, the ox dislocated his hip bone, and continued in that state till the 15th April, when he was obliged to be slaughtered, and, notwithstanding he must have lost considerably in weight during these eight weeks of illness, his carcass weighed,

		Imp. stones,	lbs.
Four quarters,	- -	165	12
Tallow,	- - -	11	2
Hide,	- - -	10	2

This was his weight at eleven years old, under all the disadvantages of travelling in a jolting carriage, and eight weeks of painful illness. Had he been kept quietly at Ketton, and fed till seven years old, there is little doubt but he would have weighed more than he did at ten years old, at which age Mr. Day stated his live weight to have been nearly thirty-four hundred weight, or two hundred and seventy stones, from which if fifty be taken for offal; it leaves the weight of the carcass two hundred and twenty stones.

It is a well ascertained fact, that, during his career as a breeder, Mr. Colling tried several experiments in crossing, and the breeds to which he resorted on these occasions, being very considerably smaller than the short-horns, this circumstance tends to corroborate the writer's opinions that he considered it desirable to reduce their size. The cross with the Kyloe led to no results worthy enumeration, but that with the *Polled Galloway* must not be passed over without comment. Before stating the circumstances attending this experiment, it may be proper to observe that no breed of cattle promised so successful a cross with the short-horns as the Galloway. They were calculated, by their deep massive frames and short legs to bring the short-horns nearer the ground, and to dispose their weight in a more compact manner: their hardy habits would be essentially useful, and the quality of their flesh and hair were such as to render the experiment still more safe. Add to this, that they could be obtained of a red color, and we are prepared to admit, even without the sanction of a successful experiment, that they were admirably adapted to cross with the short-horns, standing frequently too high from the ground, not very well ribbed home, and not seldom of loose, disjointed frame.

To this breed Mr. Colling resolved to resort; and though at the time when he did so, the event was regarded with some degree of ridicule by the pure blood advocates, and comments passed which would have deterred ordinary men from the exercise of their judgement, Mr. Colling persisted.

He was much favored by circumstances in promoting his object which was to take one cross, and then breed back to the short-horn—the only course, by the way, in which crossing can be successfully adopted. To breed from the produce of a cross *directly among themselves* will lead to the results which have induced many persons, without due consideration to believe conclusive against crossing; but to take one cross, and then return and adhere to one breed, will in the course of a few generations, be found to stamp a variety with sufficient certainty.

Mr. Colling's short-horned bull *Bolingbroke* was put to a beautiful red polled Galloway cow, and the produce, being a bull calf, was in due time, put to *Johanna*, a pure short-horn—she also producing a bull calf. This grandson of Bolingbroke was the sire of the cow *Lady* by another pure short-horned dam and from Lady has sprung the highly valuable family of improved short-horns, termed, in reproach, the *alloy*. How far the alloy was derogatory, let *facts* testify.*

It will probably be admitted that the prejudice against this cross was at the highest at the time of Mr. Charles Colling's sale. The blood had been little, if at all, introduced to other stocks, and it was manifestly the interest, whatever might be the inclination, of the many breeders who had it not, to assume high ground for the pure blood, and to depreciate the alloy. Under these untoward circumstances for the alloy, what said public opinion, unequivocally certified by the stroke of the auction-

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rode home together, they agreed that it should be a joint speculation.

Some months passed by, and either Mr. Waistell's admiration of the calf a little cooled, or his partner did not express himself very warmly about the excellence of the animal, and Messrs. Waistell and R. Colling transferred young Hubback to Mr. Charles Colling; who, with the quick eye of an experienced breeder, saw the value of the little beast. Mr. Waistell expressed to us (October, 1823,) his regret [natural enough] at having been induced to part with the sire of the short-horns, and his extreme disappointment that when Hubback began to cover, Mr. Charles Colling confined him to his own stock, and would not let him serve even one of Mr. Waistell's cows.—*Farmer and Gardener.*

* The dam of Lady was also the dam of the bull Favorite; and as the grandson of Bolingbroke is not known to have been the sire of any other remarkable good animal, it is most probable that the unquestionable merit of Lady and her descendants is to be attributed more to her dam than to her sire.—*Farmer and Gardener.*

eer's hammer? *Lady*, before mentioned, at fourteen years old, sold for two hundred and six guineas. *Countess*, her daughter, nine years old, for four hundred guineas. *Laura*, another daughter, four years old, for two hundred and ten guineas. *Major* and *George*, two of her sons, the former three years old, the latter a calf, for two hundred guineas, and one hundred and thirty; besides a number of others, more remotely descended from Lady, which all sold at high prices; in fact, in a sale of forty-eight lots, realizing £7115 17s. Lady and her descendants sold for a larger sum than any other family obtained.

The whole particulars of the first grand sale of short-horned stock ought to be preserved. We extract it from Mr. Bailey's Survey of Durham.

A CATALOGUE

Of Mr. Charles Colling's Sale of Imported Short-Horned Cattle, October 11, 1810.

COWS.

Names.	*Out of.*	*Got by.*	*Cow's Age.*	*Bulled by.*	*Sold for Gu.*
Cherry,	Old Cherry,	Favorite,	11	Comet,	83
Kate,		Comet,	4	Mayduke,	35
Peeress,	Cherry,	Favorite,	5	Comet,	170
Countess,	Lady,	Cupid,	9	do.	400
Celina,	Countess,	Favorite,	5	Petrarch	200
Johanna,	Johanna,	do.	4	do.	130
Lady,	Old Phœnix,	A grandson of Lord Bolingbroke,	14	Comet,	206
Catheline,	A daughter of the dam of Phœnix,	Washington,	8	Comet,	150
Laura,	Lady,	Favorite,	4	do.	210
Lilly,	Daisy,	Comet,	3	Mayduke,	410
Daisy,	Old Daisy,	A grandson of Favorite,	6	Comet,	140
Cora,	Countess	Favorite,	4	Petrarch,	70
Beauty,	Miss Washington,	Marsh,	4	Comet,	120
Red Rose,	Eliza,	Comet,	4	Mayduke,	45
Flora,		do.	3	do.	75
Miss Peggy,		A son of Favorite,	3	Comet,	60
Magdelene,	A heifer by Washington,	Comet,	3	Comet,	170

BULLS.

Names.	*Out of.*	*Got by.*	*Age.*	*Gu.*
Comet	Phœnix	Favorite	6	1000
Yarborough		Favorite	9	55
Major	Lady	Comet	3	200
Mayduke	Cherry	do.	3	145
Petrarch	Old Venus	do.	2	365
Northumberland		Favorite	2	80
Alfred	Venus	Comet	1	110
Duke	Dutchess	do.	1	105
Alexander	Cora	do.	1	63
Ossian	Magdelene	Favorite	1	76
Harold	Red Rose	Windsor	1	50

BULL CALVES—UNDER ONE YEAR OLD.

Names.	*Out of.*	*Got by.*	*Gu.*
Kenton	Cherry	Comet	50
Young Favorite	Countess	do.	140
Geerse	Lady	do.	130
Sir Dimple	Daisy	do.	90
Narcissus	Flora	do.	15
Albion	Beauty	do.	60
Cecil	Peeress	do.	170

HEIFERS.

Names.	*Out of.*	*Got by.*	*Age.*	*Gu.*
Phoebe	Dam by Favorite	Comet	3	105
Yough Dutchess	do.	do.	2	183
Young Laura	Laura	do.	2	101
Young Countess	Countess	do.	2	206
Lucy	Dam by Washington	do.	2	132
Charlotte	Catheline	do.	1	136
Johanna	Johanna	do.	1	35

HEIFER CALVES UNDER ONE YEAR OLD.

Names.	*Out of.*	*Got by.*	*Gu.*
Lucilla	Laura	Comet	106
Calista	Cora	do.	50
White Rose	Lily	Yarborough	75
Ruby	Red Rose	do.	50
Cowslip		Comet	25

From Evans' Italy.

PARMESAN CHEESE—IRRIGATED LANDS.

The country between Cremona and Lodi comprises the richest part of Milanese. The irrigation too is brought to the highest state of perfection. The grass is cut four times a year as fodder for the cows, from whose milk is made the well known cheese called Parmesan. The cows, which are kept in the stall nearly all the year round, are fed during summer on two of these crops of grass or clover, which are cut green, and in the winter on the other two, which are hayed. The milk of at least fifty cows is required for the manufacture of a parmesan cheese. Hence, as one farm rarely affords pasture for such a number, it is usual for the farmers or metayers of a district to club together. The milk of 50, 60, or even 100 cows, is brought twice to the farm where the dairy is fixed; the person on whom devolves the task of making the cheese, keeps an account of the milk received, and the cheese is afterwads apportioned accordingly. In this fertile plain a farm of sixty acres is considered as a large one. These farms are subdivided into fields of three or four acres, for the convenience of irrigation; a practice which, in the course of a few years, impairs the quality of the grass to such a degree, that it becomes necessary to discontinue it. In this case, the sluices of the Gora are shut, the ground is ploughed in autumn, and in the following spring sown with hemp, which shoots up to a great height; when this is pulled, the ground is sown with leguminous plants. In the next spring it is sown with oats, which grow to the height of six or seven feet. The richness of the soil being thus sufficiently subdued, it is next cropped with wheat. Maize is then sown in the following spring; a second crop of wheat succeeds, and finishes the course of cropping. The ground is then left to itself, and is immediately covered with herbage. During winter it is manured, and the new meadow is then subjected again to the process of irrigation, which is usually continued for fifteen years. Thus the rotation in the Milanese extends to twenty years; five years for the growth of hemp, pulse, and grain, and fifteen for the growth of grass. Rice is also grown in some parts of the Milanese; but as it partakes of the nature of an aquatic plant, for the rice grounds are kept under water during nearly the whole period of its growth, its cultivation has been placed under considerable restriction by the government, owing to the malaria which it engenders.

From the Silk Culturist.

VIRGINIA SILK.

Mr. Forrest Shepherd, of New Haven has presented us with a specimen of the Bombyx Virginiensis, or the native silk worm of Virginia. It is found in great numbers on the Plantation of J. B. Gray, Esq. Stafford Co., and is capable of enduring the most rigorous winter. The cocoons are found suspended upon the red cedar, and yield a beautiful white silk of a strong thread.

The future history of this insect will be particularly interesting to all engaged in the culture and manufacture of silk. Mr. Shepherd, who is soon to visit Virginia, has kindly promised to give us farther information on the subject.

From the Silk Culturist.

THE VALUE OF A FEW MULBERRY TREES.

A few years since, a farmer purchased a farm in the town of Mansfield, on which were standing twelve mulberry trees of full growth. Not being accustomed to the business of making silk, he supposed them to be of no more than the ordinary value of forest trees for fuel. A neighbor, however, soon called upon him, and agreed to pay him twelve dollars annually, for the privilege of picking the leaves. The farmer, to his astonishment, found that the twelve mulberry trees were as good to him as $200, at six per cent. interest.

FORMS FOR AN OVERSEER'S JOURNAL AND MONTHLY REPORTS, SUITED TO A SOUTHERN PLANTATION.

[The gentleman who sends the following forms, has long been engaged in planting on a very large scale, and therefore his experience is worth far more than any opinion we could offer of the usefulness of the plan. It should be observed that in the copy below, the mere plan is presented: the blank spaces, which would be required on a sheet for use, are here necessarily reduced in size, or omitted. In blank forms printed on a large sheet, to receive the actual entries, the "Journal of plantation ——, for the month ——," should occupy two entire pages facing each other—and the other two pages would give room for the several other accounts. If the blank space left at the end for "General Remarks," should not be sufficient, it could be easily enlarged by adding a blank leaf to that particular monthly report, without affecting the regular order and form of the reports.]

To the Editor of the Farmers' Register.

I send you a copy of a plantation journal which I have had made and printed after my own experience, with the request that you will subject it to the examination of practical planters, and if approved, present it the "agricultural society" of your district, with my highest respects.

The intercourse of experience, founded on practical knowledge is the only solder of an agricultural community: and every individual is bound not only by his duties to others, but by his own interests, to extend and nourish this useful interchange of systems. It is from this principle that, humble as the gift may be, I tender to you the first offspring of my own exertions—and I can only hope that like the "widow's mite," the acceptance may be secured by the purity of my motive.

You will observe that the journal is adapted for a period of one month, and is intended to be bound in boards of twelve sheets for a volume—thus forming an authentic record annually, of the operations on the estate, and serving thereafter as a reference for seasons, crops, expenses, &c. I conceive that the simple and concise form of this sheet, will enable any overseer to keep it correctly, as he will have nothing to do save to fill up the heads and columns—and when proprietors travel for the summer, or reside off their plantations, this sheet neatly folded, will as a letter, inform them of all the operations of the farm, and even its daily proceedings.

F. MACRAE.

Tallahassee, Florida.

JOURNAL OF PLANTATION

Days of he week.	Days of the Month.	State of the weather.	NEGROES. In the field. Men.	Women.	Boys.	Girls.	Jobbing.	Ginning.	Tradesmen	House servants.	Sick.	Invalids.	Nurses.	Stock Minders.	Absent.	Infants.	Increase.	Decrease.	Total.

JOURNAL OF PLANTATION.

NEGRO ACCOUNT.	Men.	Women.	Boys.	Girls.	Total.	CATTLE ACCOUNT.	Horses.	Mules.	Oxen.	Cows.	Calves.	Sheep.	Pigs.	Goats.	Total.
On hand, - - -						On hand, - -									
Increase, - - -						Increase, - -									
Total, - - - -						Total, - -									
Decrease, - - -						Decrease, - -									
Remain, - - -						Remain, - -									

LAND AND CULTIVATION.

Acres land cleared, - - -		Acres in cotton, - - -	
Acres land in wood, - - -		Acres in corn, - - -	
Acres in pasturage, - - -		Acres in rice, - - -	
Acres land barren, - - -		Acres in grain, - - -	
		Acres in potatoes, - - -	
Total land, - - -		Acres in ———, - - -	
PLANTED THIS MONTH.		Orchards and gardens, - - -	
Acres of corn, - - -		Total cultivation, - - -	
Acres of cotton, - - -		Acres vacant, - - -	
Acres of rice, - - -			
Acres of potatoes, - - -		Total cleared land, - - -	

CROP HARVESTED.

Bushels of corn, - - -		Pounds raw cotton, - - - -	
Bushels of peas, - - -		Pounds clean cotton, - - - -	
Bushels of oats, - - -		Bushels raw rice, - - - -	
Bushels rye or wheat, - - -		Pounds of pork, - - - -	
Pounds of fodder, - - -		Pumpkins, - - - -	
Pounds of hay, - - -		Bushels potatoes, - - - -	
Bushels turnips, - - -			

FOR THE MONTH OF 183

Pounds of cotton picked per diem.	EMPLOYMENT AND REMARKS.

CONSUMPTION AND EXPENDITURE.

CONSUMED THIS MONTH.	RECEIVED THIS MONTH.
Feeding Negroes, viz:	From
Corn, (No. bushels) - - -	
Potatoes, Do. - - - -	
Rice, Do. - - - -	
Salt, Do. - - - -	
Bacon, (No. pounds,) - - - -	
Pork, Do. - - - -	
Fresh beef, Do. - - - -	
Salt fish, Do. - - - -	
Tobacco, Do. - - - -	
Molasses, (galls.) - - - -	
FEEDING MULES, &c. viz:	
Corn, (bushels,) - - - -	
Oats, Do. - - - -	
Rye, Do. - - - -	
Turnips, Do. - - - -	
Peas, Do. - - - -	
Fodder, Do. - - - -	
Salt, Do. - - - -	

GENERAL REMARKS, &c.

ON THE SPAYING OF COWS, AND ITS EFFECT UPON THE SECRETION OF MILK.

A private letter from a farmer in Goochland contains the following inquiry and remarks:

To the Editor of the Farmers' Register.

"I wish to make an inquiry of your correspondents, through the Register. It is, whether any one can say with certainty, how long a cow, *spayed* when she is in full perfection, and giving the greatest quantity of milk, will continue to give milk in full quantity, if properly attended to?

"Next to the stock enclosing system, (which the repeal of the present law of enclosures would cause,) the above fact, if it be (as I have been told,) a fact, that cows will continue to give milk plentifully as long as they live, would be of the greatest importance to the poor people. They would not then have to wait, every year, for a half starved cow to have a calf, before their children could get a supply of milk to keep them from suffering for suitable food. They would have a supply for years, and that from an animal easily kept, as spayed animals always are. Small as this thing may seem to be to those who abound in the good things of this life, it is an important matter to be established as regards the poor—and middle classes too."

While joining with our correspondent in the request that others will state whatever facts they may know on this subject, we will offer such information as we are possessed of, and which, though not derived from personal experience, appears to be as well authenticated.

The only publication which we have ever met with on the spaying of milch cows, is contained in a late French periodical—though it is there stated that the advantage of this operation was first discovered by a Mr. Winn of our own country: and no other facts than his had been previously made known, nor are any given by the French writer, except the few repetitions of the experiments in Switzerland, the report of which we will present below. It is singular that so little should be known of the operation in the country in which it originated. It is not stated from what American publication the knowledge of Mr. Winn's practice was learned, and we have to confess our entire ignorance as to the source of information, as well as of the person mentioned.

Before proceeding to give the translation of the French article, we will state a fact within our knowledge, that the spaying of milch cows was practiced on the farm of a deceased friend, John Edmunds of Sussex; and that when we saw the cows and were informed by him of the facts, he was perfectly satisfied with his success, and entertained no doubt of the cows continuing to yield milk without diminution, so long as they were properly kept, and properly milked. The only doubt seems to be whether the secretion of milk will continue through the healthy life of the animal, or only for a time unusually long compared to that of breeding cows—say for several years. We were then struck with the obvious advantages of having a few permanent milkers, which with care and attention would yield regularly as much milk as thrice their number in the ordinary way—and at the same time getting rid of all the trouble of the continual changes of cows, and fluctuations (natural and artificial) of their yield of milk. The want of any person capable of performing the operation with facility and safety prevented our making the experiment. By the way—it appears below that the art of castrating domestic animals is thought in Europe not beneath the attention of government—and that able veterinary surgeons are employed to give courses of instruction to the common operators. So long as such operations are performed here by ignorant negroes, or others but little better informed, there would be greatly increased hazard of death, or of injury to cows in spaying. But there can be no doubt that if proper knowledge and skill are used, that the operation is easily performed, and perfectly safe. It is scarcely necessary to observe that spaying will not serve its intended purpose, if the cows afterwards are as badly treated and milked after the usual manner of lower Virginia—that is, to take from the cow a little less milk every week, if not every day, until she "goes dry." Our milk maids consider this to be the regular order of things; and it would be very difficult to convince them of the possibility of "flying in the face of nature," and of their established usage, by spaying cows.

Without any view of milking qualities, this operation has been used by some of the old "good livers" of lower Virginia, on heifers, for the purpose of making superior beef.

We proceed to give the article entire.

Translated for the Farmers' Register, from the *Recueil de medecine veterinaire pratique.* February 1834.

Mr. Winn, a proprietor in North America, has been the first to report that he has spayed cows, and preserved during many years the quantity of milk which they gave at the time of the operation. The action of the udder neither being injured by the function of gestation, nor by the animal being in heat, it may be conceived that the secretion of milk may continue. Many proprietors, especially those who are situated near great cities, where the high price of milk makes it unprofitable to raise calves, would derive great advantage from keeping cows whose milk would not dry up.

But the observations of Mr. Winn were not numerous, and besides, he has not indicated what method of spaying he used for his animals. We need new observations and more precise details. M. Levrat, a distinguished veterinary surgeon of Lausanne, from whom many communications have been inserted in the *Récueil de médecine vétérinaire*, reports his manner of performing this operation on the cow, and the physiological results which he has remarked after two cases. The number of facts still needs to be increased: they ought also to be observed longer, before a decided opinion is formed of the dangers and consequences of the operation. However, the notice which M. Levrat has inserted in the *Journal des Connoissances utiles* will doubtless be interesting to our readers. We give in the author's words:

"In May 1832 I was entrusted by the government of the Canton de Vaud, with the direction of a course of instructions for the country operators in the art of castration. The opportunity to repeat the experiments made in America on spaying cows, was too favorable to be missed. I performed the operation of extracting the ovaries of a cow, which was intended to be sacrificed to illustrate the course of instruction. This cow not giving milk, my object could not be completely attained. Nevertheless, it was no small gain to have studied the manual part of this operation, and to have assured myself of its pathological effect, in order to be able, on the one hand, to practice this operation with assurance, and on the other, to inspire with more confidence the owners of cows who might be willing to make the trial. My attempt was quite successful. The cow operated on did not seem to be made sick by it: during the two days which followed the operation she appeared rather drooping [*un peu triste;*] but by the third day she was as lively as before, and returned to her usual habits.

"The object then was to perform the operation on cows that were in the condition indicated by Mr. Winn, that is to say, a month after their second or third calving.

"M. Francillon Michaud, to whom I gave information of this discovery, was desirous of submitting one of his cows to the experiment. This cow, six years old, then had her third calf. The preceding years, she had given, soon after her calving, eight quarts [*pots*]* of milk, and six quarts at a later period. This cow was operated on, June 23d, 1833, thirty-eight days after calving. The consequent sickness was but slight: only it was observed that during the two days which followed the operation she had less appetite: her milk was lessened four quarts—but the third day she recovered her appetite, her liveliness, and returned to her previous quantity of milk. During the whole summer she continued to give about nine quarts; and since the supply of green food has ceased, and she has been kept on dry forage, she has kept at seven quarts—while the preceding years, as before stated, she gave [under like circumstances] but six quarts.

"Encouraged by this first success, M. Francillon requested me to make a second trial. For this, he chose an old cow, that yielded milk abundantly, in order to form a judgement of this operation upon aged cows. This one was twelve years old, and had produced twin calves on the 17th of October, and had sustained injury in giving them birth. She had yielded, in preceding years, on an average, eight quarts of milk. She was spayed on Nov. 18th, thirty-three days after calving. She gave at that time twelve quarts of milk. After the operation she lost three quarts: but it is proper to state that this cow has a discharge of matter from the womb, and that she neither eats nor digests as usual, and that it will be otherwise when she is in good health.†

"The authors of the article upon the spaying of the cow have not directed the manual part of the operation; yet it is so much the more important to know, as the ovaries vary in their position, according to the species. I do not know that any author has given the necessary directions. Daubenton has spoken of the manner of spaying ewes, and after him, Fromage of Feugre: but the practice on the ewe is not applicable to the cow: it is therefore that I am going to describe the mode of operation which I have tried, and found successful.

"The operation should be performed at from 30 to 38 days after the calving, upon a cow that has had her second or third calf, because that is the period at which a cow yields the most milk, and after which it may be enjoyed for a long time. There is no precaution necessary, save that of not permitting the cow to have a full meal the preceding evening, and to operate in the morning before she eats again. The things required for the most convenient mode of practice, are, some cords, a plank or bar of wood, two surgical knives [bistouris,] the one convex on the edge; the other straight, and with a guard on the point [boutonné]—two needles bent for stitching, with stout twisted thread, well waxed, two pegs of dry wood, eight inches long and of the diameter of about a quarter or third of an inch.

"*Manner of fixing the cow.*—To be enabled to operate in perfect security, it is necessary to fix the animal suitably. To this end she is placed against a wall, the left side turned towards the operator. This wall ought to have three buckles fixed to strong rings. One of these rings is for the cord that confines the head; the other two should be placed lower, one at the level of the lower part of the right shoulder; the other at the point of the knee bone—or an assistant may hold the cord to produce the intended confinement. The head is fixed by the cord being tied; or otherwise held by a strong assistant. Then the plank or bar is placed obliquely under the udder, forward of the posterior members—and is held by an assistant to protect the operator from the feet of the cow. The tail is also held, or it may be tied to the rope which passes round the animal, to prevent the blows from it which might be received (if unconfined) when the operator introduces his arm into the abdomen.

"For want of a wall, provided with rings and buckles, use may be made of a strong paling, a solid gate or fence, or even of trees standing at suitable distance, to which is fixed a large wooden bar.

"The animal being securely fixed, the operator armed with the knife with the convex edge, which he holds in his right hand, places himself near the left shoulder of the cow, the left hand applied to her back: this hand gives a point of support to lean on, if made necessary by the unruly movements of the animal: and this support gives more steadiness to the right hand. He carries the edge of the knife to the middle (and a little nearer the upper part) of the left flank, and with a single stroke, he cuts vertically through the skin and the muscles of this part.

"The flank having thus been opened to the *peritonæum*, [the membrane which envelopes the bowels,] the operator enlarges the incision with the guarded knife, so as to be able to pass his arm. He introduces his hand into the abdomen, directing it against the cavity, behind the bottom [*cul-de-sac*] of the paunch, where are found the horns of the uterus. As soon as he meets with this

*This measure *(pot)* is equal to two French pints—but still may be different from two American pints, as rendered above. No mistake in this respect, however, will affect the comparison of quantities yielded before and after the operations.—ED. F. R.

†It may be supposed that the time of year, and consequent diminution of green and juicy food, also had some effect in keeping down the quantity of milk in this case.—ED. F. R.

organ, where the ovaries are situated, between the thin bands [or membranes] of the ligaments suspending the uterus, he seizes one of the ovaries, which he detaches from its posterior part with the thumb and fore-finger; he passes this over the convexity of the ovary, to separate it completely from the peritonæal ligament, which sustains it: then he seizes the ovary in his hand, draws it gently, and by means of the thumb nail, he scrapes the vessels and the fallopian tube upon the fore finger, which presents a point of support under these vessels. Finally, he breaks the cord, which is the object in view, by gently drawing it, as he makes it undergo the scraping with the nail, and the ovary is brought out. He then again introduces the hand into the abdomen, and proceeds in like manner to extract the other ovary. Then the wound is closed by stitches secured with the wooden pegs, taking care not to close entirely the lower part, in order not to hinder the discharge of the matter, which, without this precaution, would spread between the skin and the muscles, and within the abdomen, and might cause ill effects which are avoided by favoring its passage out.

"The ovaries may also be drawn out of the opening made in the flank, and then detached with the ends of the fingers: but this mode may be attended with inconveniencies. Besides, it is not more expeditious than the course I have directed, because it often happens that the ovary escapes from the hand, and that the operator has again to introduce his arm to search for it.

"Two or three days after the operation, the wound must be dressed. For the dressing it is only necessary to foment twice a day all around the wound with lukewarm mallows—to keep it clean, and in warm weather to inject in the wound the water of Labarraque. Every time of dressing the wound; the aperture should be covered with a little tow placed between the two pegs, to prevent any dirt getting in, and which is secured with thread in its place. The wound being properly dressed twice a day, will cure of itself in fifteen days, or at most three weeks.

"It is seen from what has been stated above, that the effect of spaying is not merely as has been said, to keep the milk producing faculties at the height at which they were before the operation, but rather at a height *above the previous degree of those faculties;* which, without contradiction, is an important advantage, and especially if it is true that this faculty is preserved during many years.

The wounds of the cows of M. Francillon on which I operated, were dressed by his servant—and thus it ought to be managed, to avoid the expense of having the dressings attended to by a veterinary surgeon. For if this practice should spread, it is necessary to make it cheap, that it may occasion as little expense, and render as great advantages to proprietors as possible, and such as I hope they will derive."

From the Fruit Cultivator.

SOILS SUITABLE FOR APPLE TREES. MR. KNIGHT'S OPINION OF GRAFTED TREES ERRONEOUS.

Deep rich soils, in sheltered situations, are not the most proper for the apple, though such have been most erroneously recommended by writers who ought to have known better. For it is often seen that apple trees succeed well in any kind of loam, though it be not more than one foot in depth, so as the bottom is sound and dry: the roots take an extensive horizontal range, the young wood is always of more moderate growth, and better ripened than where roots strike deep into the ground.

The golden pippin being one of our most useful and esteemed hardy fruits, the author trusts he will be forgiven for entering more at large into its history and management than he has thought necessary in the preceding notices of other inferior kinds of apples, especially as there has been, for several years past, an idea prevalent, that this country was about to lose this fine fruit forever. In Mr. Knight's *Treatise on Orchard Fruit*, the doctrine was first broached, that all our varieties and sub-varieties of fruits have but a temporary existence. They are raised from seed, to flourish for an uncertain number of years, and, after arriving at their maximum of health and fertility, gradually sink to decay, and at length disappear. Taking this idea as a rule, the golden pippin was judged to be in this last stage of existence; and it was predicted, that not only were the old full grown trees to disappear, but all the young ones, lately worked from them, would perish also. It must be admitted, that a great majority of the old golden pippin trees in Herefordshire, and in other parts of the kingdom, were, about the time Mr. Knight wrote his treatise, in an apparent state of decay; and, moreover, that young trees of the same sort could but with difficulty be made to grow and bear so freely as they had previously done. These failures, however, were accounted for in another way than that propounded by Mr. Knight. It was observed, that the old trees, having probably all been planted about the same time, and having arrived at their natural period of healthy existence, were like all other trees, falling to decay from sheer old age; and that the contemporaneous weakness and debility of the young lately planted trees were caused by a careless choice of grafts, by working them on improper stocks, and planting them in old worn out soil, instead of in fresh, well trenched, light, loamy situations. This latter opinion was the more feasible, because there were many middle aged trees in different parts of the kingdom, which were in full vigor and bearing; and though young plants planted in old gardens and orchards were unthrifty such as were properly planted in newly broken up ground, provided they were worked on the best crab stocks, succeeded as well as ever.

This being the opinion of the author respecting the failure of the old golden pippin, and all other sorts of apples, he gave the subject his best consideration, and set about proving how far his own conjectures were well or ill founded; and, after the experience of forty years, he has come to the following conclusion; viz., that if crab stocks be raised from the most healthy wild trees, properly treated, and planted out in the nursery, and worked with the most healthy moderate sized scions, cut from the top of sound healthy trees, and, when fit for final transplantation, be placed on well trenched light fresh loam, having a dry bottom of rock or chalk, the trees will assuredly prosper without fear of disappointment. On the other hand, if the graft be taken indiscriminately from any tree, or from any part of a tree, and placed either on free or paradise stocks, the young trees so raised will, nine times out of twelve, be in some respect or other defective: and particularly if they be not afterwards planted in their favorite soil, where their wood would not be sufficiently ripened.

The golden pippin requires a dry and moderately warm climate. The best fruit are produced in Normandy on the continent, in Sussex in England, and on walls in Scotland. The south of France is too warm, and the richer counties of England and Ireland are too moist. This apple is supposed to have been first raised at Parham Park, on the Southdowns of Sussex.

It has been noticed of late years, that neither the golden pippin nor Nonpareil keep so well as formerly. The author well remembers, that, sixty years ago, both these kinds of apples were plentiful in May; but it is not so at present. This is attributed to two causes; our summers lately being more moist, and perhaps too many free and paradise stocks used in their nurseries. It has been deemed a good practice to raise the golden pippin from cuttings or layers. This plan is quite practicable; and some practitioners have been very successful in raising plants from cuttings, intended for potting. Trees may also be raised by layers from stools kept on purpose in the nursery.

THE MEANS OF RECOVERING AND PRESERVING YARDS FROM FOUL WEEDS.

To the Editor of the Farmers' Register.

Ben Lomond, June 6th, 1835.

Though the subject of the following communication may be considered by yourself as unworthy of a place in your periodical, yet I feel that it contains information interesting to at least a small portion of your readers. In this communication, I shall make no pretensions to *originality* or *discovery*, as my information was derived from an intelligent lady near me. She informed me that her yard was at one time infested with (I use her own words) all kinds of foul weeds, the common old field broom straw, &c. &c. While on a visit to her this spring, I was struck with the peculiar beauty of her yard, and its purity from all "foul weeds." I inquired the cause, as it was a subject of interest to me, having seen many beautiful sites for yards, destroyed by allowing the foul weeds to take possession of them.

Her *modus operandi* is simple, but which I fear will be no recommendation. At any time in the spring, (before a rain is preferable) if ashes are scattered over the yard, in a short time all the foul weeds will be rooted out, and in their place will come a beautiful bed of the greensward grass. The ashes should be scattered frequently, always before a rain, (I suppose during the year.)

Query.—Would not the sulphate of lime (plaster of Paris) accomplish the same object? Whether the ashes act as a manure, thereby facilitating the growth of the grass, or whether they destroy the weeds, I am unable to say, though I think the former supposition the most probable. This communication is induced from the reflection, that there can be no ornament more superlatively beautiful, than a handsome yard about a handsome building—and trusting that these ideas will serve a useful purpose, I am willing to submit them to your discretion, though not clothed in such a garb as I could wish for your truly useful paper.

As I highly approve of a piece which I met with in your paper, suggesting the idea that all communicators should affix their true name, I subscribe myself,

T. B. WATKINS,
Of Goochland.

[The facts stated above are not only interesting as furnishing matter for useful and often needed practice, but because they also serve to illustrate the views already expressed in other articles in the early part of this No. (pp. 129 and 130.) The principal, if not the sole agent of the change produced by the application of ashes, was the calcareous earth which they contained—of which earth, the benefit to greensward is as remarkable as to clover. Broom grass is not, usually, at once destroyed by the use of this manure, (as sheep sorrel is,) but the growth is evidently injured by calcareous manures, so as to induce the belief, that the destruction will be complete in time. We have only in one case observed the almost complete destruction of the growth of broom grass, which was previously the unmixed cover of a worn-out old field. This was also produced by top dressing—but with marl, instead of ashes. The piece of ground (about an acre) was neither ploughed nor grazed for several years after; and by the third summer, the broom grass had generally disappeared, and was substituted by other weeds, except in some small spots which it was supposed the manure did not reach. After ploughing in marl, and even after several years of tillage, broom grass will return, and even grow luxuriantly—but it is in separate and scattered bunches, instead of forming a regular and unmixed cover to the land, as before marling.

We are the more pleased to be indebted to a *lady* for this experiment—and hope that it may be noticed and repeated by other ladies who can, and will, in other matters, return equal value to the Farmers' Register—which might be well done by many.]

RICH CALCAREOUS EARTH FOR MANURE IN THE NORTH-WEST PART OF PENNSYLVANIA.

[The following article is taken from a late Meadville Messenger, sent us by the editor. We should infer, from the description, that the earth was like the "rotten limestone" which lies under all the prairie soils of Alabama—and, as appears from Mr. Featherstonhaugh's Report, (see extract at page 147 of this No.) also of the great prairies west of the Mississippi. The fact stated below, presents additional proof, and derived from a different and remote region, of the truth of the opinion which we have before submitted, that the cause of the peculiar features of prairie soils, particularly of the absence of trees, was merely *the presence, in such soils, of a large proportion of lime.* The fact of the earth here called *marl* being made into the "best lime" by burning, is sufficient evidence of the great richness of the material, and its suitableness for manure. Crawford County is in the north-west part of Pennsylvania, and on the border of Lake Erie.]

About eleven miles north west of this place, (three or four miles north of Brightstown in this county, Crawford, Pa.,) an inexhaustible bed of the *carbonate of lime* in a clayey state (*calcareous marl,*) has been discovered. The clay when burned after the usual manner, produces very good white lime, from the specimen we have seen we would say the *very best lime.* It has been found that at this one place, it covers an extent of one hundred acres, which is prairie land covered with turf to the depth of one foot, under which the marl is found, and although it has been dug to the depth of nine feet, yet no sign of other kind of earth was discovered. Apart from the general uses to which lime is applied, we are sensible that this discovery will effect a new era in the *agriculture* of this section of country, and will, when its uses as a fertilizing manure become extensively known and applied, enhance the value of our lands, two-fold. We hope this discovery will excite such a spirit of inquiry and research as will result in the disclosure of beds of lime in every part of the county; and that persons may be disposed to seek for it from an acquaintance with its nature and uses, and be able to distinguish it from other earths, we shall in some future number devote a column in explanation of its chemical properties, probable localities, and value as a manure. We have no idea that it is confined to any particular spot, but from many circumstances, are firmly of opinion that it will be found near the surface in almost every section of the county.

From the Library of Useful Knowledge—Farmer's Series.

THE VICES, AND DISAGREEABLE OR DANGEROUS HABITS OF THE HORSE.

[Continued from page 104, Vol. III.]

Horses have many unpleasant *habits* in the stable and the road, which cannot be said to amount to *vice*, but which materially lessen their value.

Swallowing without grinding.

Some greedy horses swallow their corn without properly grinding it, and the power of digestion not being adequate to the dissolving of the husk, no nutriment is extracted, and the oats are voided whole. This is particularly the case when horses of unequal appetite feed from the same manger. The greedy one, in his eagerness to get more than his share, bolts a portion of his corn whole. If the farmer can, without considerable inconvenience, so manage it that every horse shall have his separate division of the manger, the horse of smaller appetite and slower feed would have the opportunity of grinding at his leisure, without the fear of his share being stolen from him by his neighbor.

Some horses, however, are naturally greedy feeders, and will not, even when alone, allow themselves time to chew or grind their corn. In consequence of this, they carry but little flesh; they are not equal to severe work; and, if their rack has been supplied with hay when the corn was put into the manger, their stomachs will become distended with half-chewed and indigestible food; they will be incapable of exertion for a long time after feeding, and, occasionally, dangerous symptoms of staggers will occur. The remedy is, not to let such horses fast too long. The nose-bag should be the companion of every considerable journey. The food should likewise be of such a nature that it cannot be easily bolted. Chaff should be plentifully mixed with the corn, and in some cases, and especially in horses of slow work, should, with the corn, constitute the whole of the food. Of this we shall treat more largely under the article 'feeding.'

In every case of this kind the teeth should be very carefully examined. Some of them may be unduly lengthened, particularly the first of the grinders; or they may be ragged at the edges, and may scratch and wound the cheek. In the first case the horse *cannot* properly masticate his food; in the latter he *will not:* for these animals, as too often happens in sore throat, would rather starve than put themselves to much pain.

Crib biting.

This is a very unpleasant habit, and a considerable defect, although not so serious a one as some have represented. The horse lays hold of the manger with his teeth, violently extends his neck, and then, after some convulsive action of the throat, a slight grunting is heard, accompanied by an apparent sucking or drawing in of air. Whether, however, air is actually drawn in, and thus the horse becomes more subject to colic than one without this trick, or whether a portion of air is expelled, showing the previous existence of flatulence and a disposition to colic, are points that have not been settled among veterinarians.

The horse is evidently making the edge of the manger a fixed point, by means of which he may overcome that obstacle which the formation of the soft palate and the back part of the mouth would present to either the expulsion or drawing in of the air, if accomplished through the medium of the mouth. When we consider, however, that any air expelled from the stomach might easily find a passage through the nostril, without the action of crib biting; while it would be difficult or impossible, without some alteration in the natural form and action of the parts at the back of the mouth, and particularly the depression of the epiglottis or covering of the windpipe, to convey air to the stomach, we are inclined to conclude, that this fixed point is used to enable the animal to accomplish this alteration, and suck up and convey a portion of air into the stomach.

The effect of crib biting is plain enough. The teeth are injured and worn away, and that, in an old horse, to a very serious degree; a considerable quantity of corn is often lost, for the horse will frequently crib with his mouth full of corn, the greater part of which will fall over the edge of the manger; and much saliva flows out while the manger is thus forcibly held, the loss of which must be of serious detriment, as impairing the digestion. The crib biting horse is notoriously more subject to colic than other horses usually are, and to a species difficult of treatment, and even dangerous. Although many a crib biter is stout and strong, and capable of all ordinary work, these horses do not generally carry much flesh, and have not the endurance of others. On these accounts, crib biting has very properly been decided to be unsoundness.

It is one of those tricks which are very contagious. Every companion of a crib biter in the same stables is likely to acquire the habit, and it is the most inveterate of all habits. The edge of the manger will in vain be lined with iron, or with sheep-skin, or with sheep-skin covered with tar or aloes, or any other unpleasant substance. In defiance of the annoyance which these may occasion, the horse will in a very short time again attack his manger. A strap buckled tightly round the neck, by compressing the windpipe, will prevent the possibility of this action; but the strap must be constantly worn, and its pressure is too apt to produce a worse affection, viz. an irritation in the windpipe, which terminates in roaring.

Some have recommended turning out for five or six months; but this has never succeeded except with a young horse, and then rarely. The old crib biter will employ the gate for the same purpose as the edge of his manger, and we have seen him gallop across a field for the mere object of having a grip at a rail. Medicine will be altogether thrown away in this case.

The only remedy is a muzzle, with bars across the bottom; sufficiently wide to enable the animal to pick up his corn and to pull his hay, but not to grasp the edge of the manger. If this be worn a very long time, the horse may be tired of attempting that which he cannot accomplish, and may possibly for a while forget the habit; but in the majority of cases the desire of crib biting will return with the power of gratifying it.

The causes of crib biting are various, and some of them beyond the control of the proprietor of the horse. We have said that it is often the result of imitation; but it is more frequently the consequence of idleness. The high-fed and spirited horse must be in mischief, if he is not usefully employed. Sometimes, but we believe not often, it is produced by partial starvation, whether in a bad straw-yard, or from unpalatable food. An occasional cause of crib biting is the frequent custom of grooms, even when the weather is not severe, of dressing them in the stable. The horse either catches at the edge of the manger, or at the edge of the partition on each side, if he has been turned, and thus he forms the habit of laying hold of these substances on every occasion.

Wind-sucking.

This bears a close analogy to crib biting. It arises from the same causes; the same purpose is accomplished; and the same results follow. The horse stands with his neck bent; his head drawn inward; his lips alternately a little opened and then closed, and a noise is heard as if he were sucking. If we may judge from the same comparative want of condition, and the flatulence which we have described under the last head, either some portion of wind enters the stomach, or there is an injurious loss of saliva. This diminishes the value of the horse almost as much as crib biting; it is as contagious, and it is as inveterate. The only remedies, and they will seldom avail, are tying the head up, except when the horse is feeding, or putting on a muzzle, with sharp spikes towards the neck, and which shall prick him whenever he attempts to rein his head in for the purpose of wind-sucking.

Cutting.

Of this habit we have already spoken at page 252, and we would advise the owner of a cutting horse, without trying any previous experiments of raising or lowering the heels, to put on the cutting foot a shoe of even thickness from heel to toe, not projecting in the slightest degree beyond the crust, and the crust itself being rasped a little at the quarters; and to let that shoe be fastened as usual on the outside, but with only one nail on the inside, and that almost close to the toe. The principle on which this shoe acts has been explained at page 243.

Not lying down.

It not uncommonly happens that a horse will seldom or never lie down in the stable. He sometimes continues in apparent good health, and feeds and works well; but generally his legs swell, or he becomes fatigued sooner than another horse. If it is impossible to let him loose in the stable, or to put him into a spare box, we know not what is to be done. No means, gentle or cruel, will force him to lie down. The secret is that he is tied up, and either has never dared to lie down through fear of the confinement of the halter, or he has been cast in the night, and severely injured. If he can be suffered to range the stable, or have a comfortable box, in which he may be loose, he will usually lie down the first night. Some few horses, however, will lie down in the stable, and not in a loose box. A fresh, well made bed will generally tempt the tired horse to lie down.

Overreach.

This unpleasant noise, known also by the terms 'clicking,' 'overreach,' &c. arises from the toe of the hind foot knocking against the shoe of the fore foot. In the trot, one fore leg and the opposite hind leg are first lifted from the ground and moved forward, the other fore leg and the opposite hind leg remaining fixed; but, to keep the centre of gravity within the base, and as the stride, or space passed over by these legs, is often greater than the distance between the fore and hind feet, it is necessary that the fore feet should be alternately moved out of the way for the hind feet to descend. Then, as occasionally happens with horses not perfectly broken, and that have not been taught their paces, and especially if they have high hinder quarters and low fore ones, if the fore feet are not raised in time, the hind feet will strike them. The fore foot will generally be caught when it has just begun to be raised, and the toe of the hind foot will meet the middle of the bottom of the fore foot. It is a very disagreeable noise, and not altogether free from danger; for it may so happen that a horse, the action of whose feet generally so much interferes with each other, may advance the hind foot a little more rapidly, or raise the fore one a little more slowly, so that the blow may fall on the heel of the shoe, and loosen or displace it; or the two shoes may be locked together, and the animal may be thrown; or the contusion may be received even higher, and on the tendons of the leg, when considerable swelling and lameness may follow.

If the animal is young, the action of the horse may be materially improved; otherwise nothing can be done, except to keep the toe of the hind foot as short and as round as it can safely be, and to bevil off and round the toe of the shoe, like that which has been worn by a stumbler for a fortnight, and, perhaps, a little to lower the heel of the fore foot.

A blow received on the heel of the fore foot in this manner has not unfrequently, and especially if neglected, been followed by quittor.

Pawing.

Some hot and irritable horses are restless even in the stable, and paw frequently and violently. Their litter is destroyed, the floor of the stable broken up, the shoes worn out, the feet bruised, and the legs sometimes sprained. If this habit does not exist to any great extent, yet the stable never looks well. Shackles are the only remedy, with a chain sufficiently long to enable the horse to shift his posture, or move in his stall; but even these must be taken off at night, otherwise the animal will seldom lie down.

Quidding.

A horse will sometimes partly chew his hay, and suffer it to drop from his mouth. If this does not proceed from irregular teeth, which it will be the business of the veterinary surgeon to rasp down, it will be found to be connected with sore-throat, and then the horse will exhibit some other symptom of indisposition, and the swallowing of water will be accompanied by a peculiar gulping effort. In this case the disease (catarrh, with sore throat) must be attacked, and the quidding will cease.

Rolling.

This is a very pleasant and perfectly safe amusement for a horse at grass, but cannot be indulged in the stable without the chance of his being dangerously entangled with the collar rein, and being cast. Yet, although the horse is cast, and bruised, and half-strangled, he will roll again on the following night, and continue to do so as long as he lives. The only remedy is not a very pleasant one to the horse, nor always quite safe; yet it must be had recourse to if the habit of rolling is inveterate. 'The horse,' says Mr. Castley, in the *Veterinarian*, 'should be tied with length enough of collar to lie down, but not to allow of his head resting on the ground; because, in order to roll over, a horse is obliged to place his head quite down upon the ground.'

Shying.

We have briefly treated of the cause of this vice at page 98, and observed that while it is often the result of cowardice, or playfulness, or want of work, it is at other times the consequence of a defect of sight. It has been remarked, and we believe very truly, that shying is oftener a vice of half or quarter-bred horses, than of those who have in them more of the genuine racing blood.

In the treatment of shying, it is of great importance to distinguish between that which is the consequence of defective sight, and that which results from fear, or newness of objects, or from mere affectation or skittishness. For the first, the nature of which we have explained at page 98, every allowance must be made, and care must be taken that the fear of correction be not associated with the imagined existence of some terrifying object. The severe use of the whip and the spur cannot do good here, and are likely to aggravate the vice ten-fold. A word half encouraging and half scolding, with a gentle pressure of the heel, or a slight touch of the spur, will tell the horse that there was nothing to fear, and will give him confidence in his rider on a future occasion. It should be remembered, however, that although a horse that shies from defective sight may be taught considerable reliance on his rider, he can never have the cause of the habit removed. We may artificially strengthen the human sight, but the horse's must be left to itself.

The shying from skittishness or affectation is quite a different affair, and must be conquered: but how? Severity is out of place even here. If he is forced up to the object by dint of correction, the dread of punishment will afterwards be associated with that object, and on the next occasion, his startings will be more frequent and more dangerous. The way to cure him is to go on, turning as little as possible out of the road, giving the animal a harsh word or two, and a gentle touch with the spur, and then taking no more notice of the matter. After a few times, whatever may have been the object which he chose to select as the pretended cause of affright, he will pass it almost without notice.

In page 225, under the head 'breaking in,' we have described how the colt may be cured of the habit of shying from fear or newness of objects; and if he then be accustomed as much as possible to the objects among which his services will be required, he will not possess this annoying vice when he grows to maturer age.

Mr. John Lawrence, in his last pleasing work on the horse, says, 'These animals generally fix on some particular shying butt: for example, I recollect having, at different periods, three hacks, all very powerful; the one made choice of a windmill for the object or butt, the other a tilted wagon, and the last a pig led in a string. It so happened, however, that I rode the two former when amiss from a violent cold, and they then paid no more attention to either windmills or tilted wagons than to any other objects, convincing me that their shying when in health and spirits was pure affectation, an affectation however, which may be speedily united with obstinacy and vice. Let it be treated with marked displeasure, mingled with gentle, but decided firmness, and the habit will be of short endurance.*'

* 'We will suppose a case, a very common one, an every day one. A man is riding a young horse upon the high-road in the country, and meets a stage coach. What with the noise, the bustle, the imposing appearance altogether, and the slashing of the coachman's whip, the animal at its approach erects his head and crest, pricks his ears, looks affrighted, and no sooner comes alongside of the machine than he suddenly starts out of the road. His rider, annoyed by this, instantly commences a round of castigation with whip, spur, and curb, in which he persists until the horse, as well as himself, has lost his temper; and then one whips, spurs,

Shying on coming out of the stable is a habit that can rarely or never be cured. It proceeds from the remembrance of some ill-usage or hurt which the animal has received in the act of proceeding from the stable, such as striking his head against a low door-way, or entangling the harness. Coercion will but associate greater fear and more determined resistance with the old recollection. Mr Castley, to whom we are indebted for much that is valuable on the subject of the vices of the horse, gives an interesting anecdote, which tends to prove that while severity will be worse than useless, even kind treatment will not break a confirmed habit. 'I remember a very fine gray mare that had got into this habit, and never could be persuaded to go through a door-way without taking an immense jump. To avoid this, the servants used to back her in and out of the stable; but the mare happening to meet with a severe injury of the spine, was no longer able to back; and then I have seen the poor creature, when brought to the door, endeavoring to balance herself with a staggering motion upon her half-paralyzed hind extremities, as if making preparation and summoning up resolution for some great effort: and then, when urged, she would plunge headlong forward with such violence of exertion, as often to lose her feet, and tumble down "altogether most pitiable to be seen." 'This I merely mention,' he continues, 'as one proof how inveterate the habits of horses are. They are evils, let it always be remembered, more easy to prevent than cure.'

Slipping the Collar.

This is a trick at which many horses are so clever that scarcely a night passes without their getting loose. It is a very serious habit, for it enables the horse sometimes to gorge himself with food, to the imminent danger of staggers: or it exposes him, as he wanders about, to be kicked and injured by the other horses, while his restlessness will often keep the whole team awake. If the web of the halter, being first accurately fitted to his neck, is suffered to slip only one way, or a strap is attached to the halter and buckled round the neck, but not sufficiently tight to be of serious inconvenience, the power of slipping the collar will be taken away.

Tripping.

He must be a skilful practitioner or a mere pretender who promises to remedy this habit. If it arises from a heavy forehand, and the fore legs being too much under the horse, no one can alter the natural frame of the beast: if it proceeds from tenderness of the foot, grogginess, or old lameness, these ailments are seldom cured; and if it is to be traced to habitual carelessness and idleness, no whipping will rouse the drone. A known stumbler should never be ridden, or driven alone, by any one who values his safety or his life. A tight hand or a strong bearing-rein are precautions that should not be neglected, but they are generally of little avail; for the inveterate stumbler will rarely try to save himself, and this tight rein may sooner and farther precipitate the rider. If, after a trip, the horse suddenly starts forward, and endeavors to break into a canter, the rider or driver may be assured that others before him have fruitlessly endeavored to remedy the nuisance.

If the stumbler has the foot kept as short and the toe pared as close as safety will permit, and the shoe be rounded at the toe, or have that shape given to it which it naturally acquires in a fortnight from the action of such a horse, the animal may not stumble quite so much; or if the disease which produced the habit can be alleviated, some trifling good may be done, but in almost every case a stumbler should be got rid of, or put to slow and heavy work. If the latter alternative be adopted, he may trip as much as he pleases, for the weight of the load and the motion of the other horses will keep him upon his legs.

Weaving.

This consists in a motion of the head, neck, and body, from side to side, like the shuttle of a weaver passing through the web, and hence the name which is given to this peculiar and incessant action. It indicates an impatient, irritable temper, and a dislike to the confinement of the stable; and a horse that is thus incessantly on the fret will seldom carry flesh, or be safe to ride or drive. There is no cure for it, but the close tying up of the animal, except at feeding time.

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and pulls, and the other jumps, plunges, frets, and throws up his head, until both, pretty well exhausted by the conflict, grow tranquil again and proceed on their journey, though not for some time afterwards in their former mutual confidence and satisfaction. Should they in their road, or even on a distant day, meet with another coach, what is the consequence? That the horse is not only more alarmed than before; but now, the moment he has started, being conscious of his fault, and expecting chastisement, he jumps about in fearful agitation, making plunges to strike into a gallop, and attempting to run away. So that by this correction, instead of rendering his horse tranquil during the passage of a coach, the rider adds to the evil of shying that of subsequently plunging, and perhaps running away.'—The *Veterinarian*, by Messrs. Percival and Youatt, vol. i., p. 96.

From the Horticultural Register.

ON PARTY SPIRIT IN HORTICULTURE.

Start not, reader; the caption of this article forebodes no bloodshed in America, and however violent the spirit, the subject is merely a *Rose.*

It is in the great commercial, free Hanseatic city of Hamburg, in Germany, that this flame of discord has been kindled, which threatens even to falsify the line of the great delineator of the human character, that,

"A rose by any other name would smell as sweet."

It appears that Messrs. Booth, proprietors of the Flottbeck Nursery, near Hamburg, had raised a new rose from the seed of the old and well known Maiden's Blush, which is described as wonderfully beautiful (wunderschön) and of which they had consequently sold a large quantity. This they called in their catalogue the Queen of Denmark rose.

Professor Lehmann, Director of the Hamburg Botanic Garden, in his descriptive catalogue remarks on a variety of the rose, there called La Belle Courtisanne, that this rose was described in France in 1806 as a hybrid between the old Dutch Hundred Leaf and the Maiden's Blush.

The roses being identical, Messrs. Booth felt the honor of their well regulated nursery at stake, and after some slight warfare in their respective annual catalogues, these gentlemen published a pamphlet on the subject, which was replied to by the Professor in the newspaper. This produced a very bitter and personal rejoinder from Messrs. Booth, in a second pamphlet, which was distributed gratuitously.

The Professor having stated that the rose in question was figured in the magnificent and expensive publication, with colored plates, by the celebrated Redouté, fellow pupil with Audubon, of David the painter, he procured the work and left it out for public exhibition. Redoute's figure was generally considered identical with Booths' Queen of Denmark, although these gentlemen would scarcely allow it.

A hot war of affidavits, letters of proof, and documents now commenced, the most interesting of which is a letter from the distinguished veteran botanist, Thouin, who died in 1826, dated in 1824, which gives some good explanations of the Professor's strong declaration, and shows that the Belle Courtisanne rose, under this name, was sent by Thouin to the Hamburg Botanic Garden, from whence it was also distributed to many other gardens.

Messrs. Booth hereupon published gratis a most offensive pamphlet, entitled "Victory of the Queen of Denmark Rose, unveiling the motives of the attack of Professor Lehmann." To this the Professor published a cool and well written reply; the friends on each side began to publish also—accusation and retorts were liberally scattered and the plague of party spirit spread far and wide. We do not think, however, it will terminate in a continental war.

That elegant German writer, Wieland, in his fiction of the history of the people of Abdera, a town in ancient Greece, relates that a citizen of the town hired an ass; the day being sultry, he took it into his head during his ride, to dismount from the patient animal, and sit down for a time in the shade of the creature's body. The owner demurred to this proceeding, and demanded additional hire, having, as he stated, only let the ass, and not his shadow. After a warm altercation, both returned to the city and went before the magistrate. The question now became altogether one of party, in which no neutrality was permitted, and the whole city was soon divided into two violent sides, one of which obtained the appropriate distinctive appellation of *Asses*, and the other of *Asses' shadows*. During a popular commotion on this quarrel, the innocent cause of it was torn limb from limb—thus even the shadow of an ass was annihilated, and had not some other question of equal importance been started, which threw this into oblivion, the result would no doubt have been disastrous. We disclaim the slightest idea of an offensive application of the above story; it is enough to show how well those understand the human heart who describe a trifle as sufficient to inflame the bad passions of mankind.

The highly talented German botanist, Nees Von Esenbeck, writes two letters on this quarrel, which have been published in the *Allemeine Botanische Zeitung*, (General Botanical Newspaper) commencing in something like the following lively vein:

"How much that is beautiful, joyous, and endearing has been written and said on the rose; how much that is delightful on its character? how many exquisite ideas has it inspired to be breathed by love? The beauty of this flower must sink deepest into our imagination, when its appearance forces us to associate with it every feeling that is tender, delicate, and luxurious. How anomalous, how absurd, then, the idea that the rose can engender feelings of division and strife. I am convinced that in the beautiful manuscript of my young friend Doring, 'On the Character and Nature of the Rose,' there is not even the smallest chapter on the fruit of rose as an apple of discord."*

It is hardly worth while to read every statement and counter statement in this quarrel, but we believe that Messrs. Booth, the nursery men, must have the best of it, as undoubtedly the excitement has enabled them to sell the greater part of their stock of this rose, as well as of many others approaching to it in character, to enable a comparison; while the publishers of Redouté's work on roses have certainly disposed of several copies to persons who have withstood the best newspaper puffs that ever were penned.

[There have been very many instances, in modern as well as ancient times, of parties being formed, and bitter feuds engendered among countrymen, neighbors, and former friends, for causes not more important, and even less understood, than those from which have originated the *rose factions* mentioned above. And most parties agree with those of the *roses* in another respect—that the few knaves who lead, on both sides, may gain by the feud, while the many fools who follow them, are sure to be losers.]

From the Horticultural Register.

ON THE VEGETABLE PRODUCTION OF INDIA RUBBER, AND ITS APPLICATION TO MANUFACTURES.

At the present time, when attention to this subject is so much awakened, we deem an account of it will be of some interest to our general readers, particularly as an entirely new and extraordinary use for it has been very recently discovered and patented in England.

The India rubber in the state it is imported into this country, is the concrete juice of the Hevea caoutchouc, or guianensis, a Euphorbiaceous plant which abounds in South America; it is also produced from the Apocyneous plants, as Urceola elastica, of Sumatra, Vahea Madagascariensis, Ficus elastica, of the East Indies; and from Artocarpeous ones, as Ficus indica, the Banyan tree also of the East Indies, Artocarpus incisa, the Bread fruit tree, from the West Indies, and from many trees in Africa. In fact, plants producing it grow in almost all countries in or near the tropics. The produce of these is sometimes equal to nearly

* The apple was placed by Decandolle in the Rosaceous family, from which it is now, however, properly separated. It is classed with others in a distinct order called Pomaceæ, from Poma, an apple. The figure of Nees Von Esenbeck, of the rose fruit being an apple of discord is therefore not so far wrong as may appear at first sight.

two-thirds the weight of the branch tapped, and when exhausted, but a few months' rest are required to replenish the vessels; the supply is therefore equal to almost any consumption, although no doubt exists that this will increase amazingly. A small quantity has been manufactured from the juice of a tree in the Glasgow botanic garden, and exposed to the public at an agricultural museum at Stirling in Scotland.

Mr. Nuttall observes that the juice of the Milkweed, Asclepias Syriaca, which grows plentifully in the vicinity of Boston, as well as of that of the Apocynum is convertible into a substance resembling gum elastic.

A patent has been very recently granted in England for the manufacture of an essential oil or liquid, by distilling India rubber at a given heat in close vessels made for that purpose; by redistillation it comes over pure and transparent. This oil has many singular characters. It is the lightest liquid known, being of less specific gravity than sulphuric ether, it is exceedingly volatile, yet the gas formed when it evaporates is the heaviest gas known, and may be poured out of one vessel into another like water, as was exhibited at a late lecture given on it, by Dr. Faraday in London. The rapid evaporation of it, produces intense cold; one minute and a quarter was sufficient to reduce the thermometer from 60° Fahrenheit to 10° below zero, by covering the bulb with muslin and blowing on it with a bellows, while this liquid was dropped on it.

On removing the muslin at about 10° above zero, in another experiment, the bulb was observed to be covered with a concrete substance resembling snow, termed by Dr. Faraday. Bicarburet of Hydrogen, supposed to have been previously discovered by M. Mitscherlich.

On mixing this produce of India rubber with cocoa-nut oil, which is known to be always hard at the usual temperature of the atmosphere, in the proportion of one-quarter of the former to three-quarters of the latter, the cocoa-nut oil is liquified and gives a most brilliant flame.

Mr. Beale has taken out a patent in England, for a new lamp to burn this mixture; one of them was exhibited at the before mentioned lecture, and surprised the audience by its peculiar brilliancy.

It mixes readily with oils used for painting, and evaporates so speedily that the paint dries within an hour after laying it on. As it is extremely cheap and does not in the least injure the most delicate colors, it is probable that it will be considerably used for this purpose.

One of its most important properties, however, is that of completely dissolving all the gum resins, particularly gum copal, without the assistance of heat, therefore the varnish may be prepared without the usual danger from fire. It is also a perfect solvent in cold, of India rubber itself, and when this is laid on any substance in its liquid state, the oil evaporates and leaves the India rubber without the slightest alteration of its character, fixed on the material.

Messrs. Enderby & Co. of Greenwich, near London, have established a manufactory of this substance on a large scale, and have sent an agent to South America for the purpose of procuring a constant supply—they have always about one hundred tons to operate on.

The principal object of their manufactory, is to saturate the fibres of the Phormium tenax or New Zealand flax, with this liquid previous to its being made into cables, thereby rendering it totally impervious to water, and protecting it altogether from the effects of damp and moisture.

It has been named Caoutchouchine from Caoutchouc, another name for India rubber—which it is supposed, if carefully managed on distillation, would give nearly weight for weight of this oil.

Being so recently discovered, its properties are of course by no means entirely developed, and much remains yet to be known on the subject. Dr. Faraday's lecture is represented to have been most interesting—he exhibited the juice of the India rubber in its fresh state and explained how it deposited the article of commerce—he entered also into a chemical analysis of it, the repetition of which here would be trespassing too far on our horticultural readers.

J. E. T.

From the Genesee Farmer.

ASHES AS MANURE.

Farmers who now have ashes on hand, will find it profitable to apply it as a top dressing to their corn, instead of selling it at the asheries. An application of ashes to this crop will not unfrequently cause an increase of more than five times the value of the ashes at the price they are commonly sold. Ashes which have been kept perfectly dry and uninjured are far preferable to leached, though the latter is very valuable. When it is applied to corn, one gill of that which is fresh or unmoistened will be enough; if leached, half a shovel full will not be too much. It is recommended that when unleached ashes is appled, it be placed on the surface round each hill so as not to touch the plants, as it might otherwise injure them by its causticity.

LEGAL RESPONSIBILITY OF POSTMASTERS TO PUBLISHERS FOR A VERY COMMON NEGLECT OF THEIR DUTY.

"The proprietor of this paper" says the Philadelphia Times, "last week, recovered judgement against a postmaster for a paper not taken from his office, of which he neglected to inform him. All postmasters who do so, render themselves liable, and ought to be held accountable."

We earnestly wish that every *careless* postmaster in the United States, and especially some of those to whose offices the Farmers' Register is sent, would read and profit by this warning. With many of these officers the most culpable neglect of their sworn duty in this respect, (if not worse than neglect,) is frequent. We have suffered by it, in common with most of our editorial brethren, by some very long continued and most gross offences of this kind—and if no other redress can be obtained, we shall try whether the law will afford it in Virginia, as well as in Pennsylvania. If publishers generally would adopt such a course, they would check much of the disposition to indulge in gross neglect, if not in petty pilfering.

From the New York Farmer.

BROOM CORN.

The cultivation of broom corn is carried on to a very great extent on some of the alluvial lands on the Connecticut river, and in small patches in many of the interior towns. The towns of Hadley and Hatfield raise large quantities, which are manufactured into brooms, and distributed throughout the country. The seed is considered of about two-thirds of the value of oats, and, mixed with corn, makes an excellent provender for the fattening either of swine or neat cattle. The return of seed is somewhat precarious; but often it is abundant, and will more than pay the whole expense of cultivation and preparing the crop for the market. I have known a case in which 150 bushels of good seed have been obtained from an acre; and I have been assured, on good authority, of a still larger yield, though this is not frequently to be expected. One thousand pounds of broom to an acre is a very good crop. It will pay well for manuring and good culture. No crop is more beautiful than the standing corn when in perfection. It frequently attains a height of 12 to 15 feet. The stalks of the plant are very long and hard, and, therefore, rather difficult to load upon a cart. They are considered as of no value but for manure. The usual practice is to table the corn, that is, to cut off the top, or tassel the broom, as it is called, about two feet from the top, and bending the stalks of two rows together, lay it down until it is seasoned and fit to be carried in. The remainder of the stalks are then burnt in the spring in the field, and some little advantage is derived from the ashes. A much better way, it is thought, is, after gathering the crop, to cut the stalks and lay them lengthwise in the rows, and plough them immediately under. They will become entirely decomposed by spring. A still better mode is to carry them into the cattle and sheep yards, where they become incorporated with the manure, and make a valuable addition to the compost heap.

The seed is planted in rows, wide enough apart for the plough to pass conveniently between them, and dropped in hills about eighteen inches from each other. Four or five stalks are considered sufficient to remain in a hill—more are sometimes allowed. The cultivation and manuring is more than for Indian corn. It may be manured in the hill or by spreading, or in both ways, as you have the means of high cultivation, which this plant will bear. The stalks are not eaten by cattle, nor even browsed by them; but I am not certain that the leaves would not furnish a good feed for young stock, if stripped early, when tender, and well cured, as the Indian corn blades are cured at the south. What would be the effect of such mutilation upon the crop itself, and whether it would compensate for the labor, are inquiries which I am not able to answer, and in respect to which I cannot learn that any experiments have been made. It is an important subject for experiment. As it is at present managed, the plant returns little to the ground compared with Indian corn; and the Hadley and Hatfield farmers are obliged to connect with it the fattening of beef to a considerable extent, to furnish manure for their broom corn.

It is deemed a good crop when the broom commands five cents per lb. The price has heretofore been subject to great fluctuations. At one time it was the custom for every farmer to make up his own brooms, and then to go and sell them where he could. This was bad for all parties. It brought too many competitors into the market; and often unduly depressed the price, and the buyers were often obliged to put up with an inferior article. Now the manufacturing and the growing of the broom are in different hands; and the farmer, as soon as his broom is ready for the market, finds a purchaser at a steady price; and the manufacturer feels that his reputation, and consequently his success, are concerned in the quality of the article which he furnishes.

It is a little remarkable, that notwithstanding the extent and importance of this product, for one manufacturer within a few miles of me makes several hundred thousands of brooms a year, that in no book of agriculture in my possession can I find any account of the cultivation of this plant, not even in that excellent New England work, "*The Complete Farmer.*" The Shakers for a long time almost monopolized the raising of the plant and the manufacture of brooms; and their brooms, which, like the other manufactures of this industrious community, were always of a superior quality, usually commanded a high price, generally 42 cents or more. Corn brooms are now frequently sold from eight to twenty-five cents; but many of them are like Pindar's razors, "made to sell." The Shakers, however, maintain the quality of their manufacture. The handles, in an unfinished state, are furnished for a cent a piece; the wiring and the tying on are usually done by the hundred. The scraping the seed from the brush is an unpleasant business, and often very injurious to the eyes. The manufacture, where it has been carried on extensively and with ample capital, has yielded encouraging profits.

An intelligent and enterprising farmer in my neighborhood, who last year cultivated three acres and one-half of broom corn in our alluvial meadows, has been kind enough to furnish me a detailed account of the expense of cultivating an acre, which may be relied on for its exactness, but in which the rate of labor is probably over-estimated by the day. His broom was sold in the autumn at eight and one half cents per lb. It readily commands this spring $12\frac{1}{2}$ cents; had he fortunately retained his broom until this time, the profits would have been greatly enhanced, while the expenses would, of course, have remained the same.

Account of the expenses of cultivating an acre of broom corn in Deerfield meadows, in the year 1834, by Mr. Alvah Hawkes:

One ploughing, 12th May,	$1.25
Holeing out, one-third of a day's work,	34
Ten loads of manure, at 75 cents,	7.50
Putting manure in the hill,	2.00
Planting, one day's work,	1.00
Seed, four quarts, at 75 cents per bushel,	10
Hoeing, first time $3\frac{1}{2}$ days,	3.50
do. 2d do. 3 do.	3.00
do. 3d do. $2\frac{1}{2}$ do.	2.50
Horse and boy to plough for the season,	1.00
Tabling and cutting, four days,	4.00
Gathering, carting, and packing away,	2.50
	$28.68

The expense of cultivating one acre is $28.68

cents, the labor being rated at one dollar per day, which is more than the actual cost, as I hired my laborers by the month, at from six to ten dollars per month. The yield was at the rate of 991 pounds to the acre. Had all my ground been fully stocked, it would have exceeded ten hundred pounds per acre.

The expense of scraping the brush for the seed was thirty-three cents per hundred pounds. The brush was sold at $8\frac{1}{2}$ cents per pound. The crop of seed was light and poor; fifty bushels to three acres, worth $16\frac{2}{3}$ cents per bushel, or $8.33 to an acre.

Summary expense of cultivation of one acre as above,		$28.68
Scraping 1000 pounds,		3.30
Board of man five days,		1.07
Rent of land, say $16 per acre,		16.00
		$49.05
Sale of brush, 1000 lbs. at $8\frac{1}{2}$ cents,	85.00	
Seed upon one acre,	8.33	
		93.33
Net profit on one acre,		$44.28

The sale of the brush at $12\frac{1}{2}$ cents per pound, the present price, would have enhanced the profits forty dollars, and made them $84.28. This is very remarkable, and certainly affords ample encouragement to labor. That it can be often done is not to be expected; and yet there is nothing extraordinary in the process. The uncertainty of the seasons is something, and the fluctuations in the market prices of broom are great. The amount of crop, though large, was not more than can usually be commanded by good and generous cultivation. Many of our lands, besides the alluvial meadows, are capable of producing good crops; and the great yield of 150 bushels of seed to the acre mentioned above, with broom, of course, in proportion, was produced in one of the most rough and rocky towns in the commonwealth, and on land which owed every thing to good management. I hope the length of these details may be excused.

H. C.

Meadowbanks, (Mass.) May 7th, 1835.

From the Southern Agriculturist.

ON THE DISEASES OF TREES, AND METHODS OF CURE.

When it is observed of a tree, that it does not shoot forth, we are certain that it is either punctured to the liber or white bark, or that it is deficient in nourishment from the poverty of the earth, in which it is planted, that will in time prove its destruction. The remedy is to lay bare the roots in the month of November, for three feet around the tree, and put in three or four baskets of well rotted cow manure; throw upon this three or four buckets of water to force the manure amongst the roots, after which fill up the hole with the same earth that was taken out of it: the roots becoming refreshed, throw out new fibres, and the year after the tree will be seen shooting forth its green foliage again. If the summer is very dry you must throw two buckets of water around it from time to time. The winter following in trimming the trees, you must not leave as many branches as on those that have always been in good health. Trees of every description are cured in this manner.

Bad soil.—Fruit trees accommodate themselves more to warm light earth than to that which is cold and wet.

Diseased roots.—Frequently a tree, all of a sudden, after have thriven many years, will become weak and languid: this arises from the roots becoming rotten from having been planted too deep, from the many fibres, from humidity or otherwise. This is easily remedied by laying bare the roots in autumn, and cutting off such as are decayed, up to the sound wood.

Exhausted earth.—If the tree languishes in its sound roots, the malady arises from the earth being too much exhausted. To reanimate it, remove the exhausted earth and replace it with new; afterwards throw around the foot of the tree two good baskets of cow manure, if the earth is warm, or that of the horse if it is cold, and when the time arrives to trim it, cut out the old wood. If it does not shoot forth well the succeeding year, it ought then to be dug up and thrown away.

To regenerate old trees.—When you have in your garden a very old tree, whose branches on the right and left indicate dying, you may calculate the cause to be in the roots: it wants nourishment, and the earth about its feet is too old, exhausted and dry. To give it again health and vigor, lay bare the roots in the month of November, for four feet square all around them so as not to injure them; afterwards throw five or six baskets of well rotted cow manure above the roots, the fall and winter rains will decompose it; if the winter is dry, you must water it, in order that the liquor of the manure may become a kind of pus to nourish the roots; the sap will begin to flow, and the earth and tree revive. In the month of February, cut the old branches to the body of the tree, covering the wound so as to prevent either rain or the sun from doing any injury. After the first year, the branches will be three feet; and, if it is a tree which ought to be trimmed, the winter after trim the branches a foot long. This manner of resuscitating all kinds of trees is excellent.

Trees diseased on one side only.—If a tree is diseased on one side and vigorous on the other, lay the roots entirely bare, remove the diseased part, and cut the larger roots in order to make the tree equal, and the circulation of the sap more general; put new earth above the roots, even if they should not be unhealthy, and two or three baskets of manure as above.

When you trim this tree, leave the vigorous side long, and you must leave all the fruit branches, even the weakest, so as to draw the sap: trim very close the diseased side; cut off all useless branches, and leave a few fruit branches.

Yellow leaves.—This disease arises often from the same cause as that of the disease last spoken of, that is to say, exhausted earth. In such case administer new earth mixed with manure reduced nearly to that of common earth; or, without entirely uncovering the roots, with ashes and soot, these materials are very good for light earths. When the ground is cold, pigeon dung is very good, particularly where it has been in a heap for two years, to ameliorate its strong heat; spread it an inch deep about the foot of the tree, and in the month of March following bury it. For the want of this dung, you must take away the old earth from around the tree and replace it with new, mixed with fine well rotted horse manure. If the yellowness arises from the earth being damp, take horse-dung mixed with water, so as to form a kind of pap, make a trench around the foot of the tree, pour in the mixture, cover it, and let it thus remain: it will reanimate it. If the yellow leaves arise from a contrary cause, that is, from the soil being too light and dry, you must as soon as the month of November arrives uncover the roots, and put above them the scrapings or settlings of a pool, well drained, worn out, and exhausted street mud; hog-dung or other similar manure: these simple and easy means will resuscitate them.

A tree often becomes yellow from having given too much fruit, and exhausting its substance. In this case you must pull off a part of the fruit and apply fresh nourishment to the roots.

When a tree appears to languish, make a circle around the foot of it, in which you must put any convenient manure; in trimming it, cut off all superfluous wood, and after having filled up the hole in which you have put the manure, leave nature to act, and she will resuscitate it soon. In digging around the tree, keep off at from two to four feet distance, observing as you approach the tree to dig carefully around the mound in which the roots are formed.

Sterility.—Open the earth about the foot of the tree, cut off the extremities of the large roots, shorten those that are too long or far off, and all the small ones near the trunk; throw good new earth upon them and cover them up.

Means to produce fruit from trees which flourish well, but whose fruit becomes blighted almost every year.—There are some trees which are charming to the sight when in blossom, but which retain none of their fruit: in this case, at least six buckets of water thrown around them when in full bloom, will answer a good purpose. If you have not so much water, you may refreshen the tree by sprinkling the buds. When the fall of the blossoms is in too great an abundance, bleed the tree or prune the roots.

Inertness of the sap.—In very cold and dry summers in which there is not much rain, it happens that the sap ceases to flow by degrees. You will then see a great portion of the fruit, particularly peaches, which have the most need of a large stock of sap to acquire maturity, fall or prove abortive. The only remedy in this case is to open around the foot of the tree, and to throw in a bucket of water to open the pores and revive the sap, which will prove well that watering and vigilance are necessary in gardening.

When the spring is dry and cold, it happens often that a peach tree does not shed its blossoms, the flower attaching itself to the small nut of the peach, dries it up and makes it fall; to remedy this, you must bare the roots and throw in buckets of water, and when it is dried up, cover them again with earth, and continue watering them every week during the months of March and April, until you find the fruit safe and well grown; this raises the sap and saves the fruit; it is good to water freely peach and apricot trees during the great heat of summer, and above all, when the fruit is approaching to maturity. When the fruit is well grown, the tree must be thinned of those that are superabundant, which not only makes the fruit grow larger but better, it also preserves the vigor of the tree, which would become ruined in two or three years, if you do not proportion the fruit to the strength of the tree. Peaches, nectarines, and apricots, must be thinned in May. Only a few fruit must be suffered to remain on the weak branches.

When the heat is great and a continual drought, at the end of July, and during the month of August, it is good to throw around the foot of the tree, and particularly the peach, a bucket or half bucket of water, so as to rouse the sap and prevent the fruit from falling half ripe. When you observe the tree languish and the fruit advance very slowly and fall in great numbers, you may be sure it is in the sap: you must then put water to the foot of the tree, for which purpose you must make a trench around it at a short distance, so that the water may be better held, cover the earth with leaves or straw, and throw water on it, so as to enable the earth to preserve its freshness.

To give fruit a fine color, about the end of June clip with a scissors those leaves that surround the fruit, and when they have grown nearly to their size, remove all their leaves from around them, so that the dew, rain and sun may penetrate, paying attention to the soil, the weather, and the strength of the fruit, for delicate fruit becomes scorched if laid bare too soon, and if too late will remain without color and taste. Peaches and apricots should be laid bare only fifteen days previous to their being ripe, otherwise the fruit would become defective and imperfect about the stone. By jetting water with a syringe upon fruit exposed to the sun two or three times a day, you will give it a peculiar and curious color, but at the same time impair the quality.

When the severity of the heat occasions the fruit to fall, instead of watering, dig round the roots two inches deep, which fill up with the ashes of wood, and to prevent the wind from blowing it away, cover this ashes with earth.

Peaches and apricot trees are liable to what is termed the blight, which is an injury that shows itself by the leaves becoming crimped, shrivelled, dull and yellow, they fall about the first rain; you have nothing to do but first to remove all the blighted leaves, so that the new foliage of the succeeding spring by force of the sap of those which have been blighted, come quicker.

To remove gum you must with a proper instrument cut down to the inner part of the tree, and cover the wound with dry earth tied on with a cloth.

This is the general method of treating diseased trees in France, which from similarity of climate with that of this country, will apply here. Many persons believe it to be only necessary to plant a tree, and that nature will do all the rest. It is true, we must depend upon nature for the success of our endeavors; but we must recollect that the fruit trees we cultivate, are not indigenous to this climate, and that our want of skill and judgement in planting and nourishing them, may embarrass the operations of nature in bringing the fruit to perfection. It becomes necessary, therefore, to ensure success, that we should aid nature in her operations, by removing all obstructions to her efforts, and furnishing the proper attention and nourishment for the prosperity of the tree. In order to effect this, observation and experiments are necessary; and ordinary care and attention to the method prescribed above, will be sufficient to accomplish our purpose.

How much, then, is to be deprecated that want of zeal, which is so clearly manifested in this section of the country in relation to the cultivation and care of fruit trees. Providence has peculiarly blessed us with the means of indulging in most of the luxuries enjoyed by other sections of the globe, but our apathy appears to have created a total disregard to her munificent blessings in this respect. There is no spot on earth where most of the stone fruit of other climes, could be cultivated in more perfection than in this State. The diversity of soil produces diversity of fruit, and although, on Charleston Neck, peaches and nectarines are destroyed by various insects, yet, all kinds of plums and cherries may be raised in great perfection: some of the latter raised there by Mr. Michel, are equal in every respect to any ever produced in a more northern climate. Cultivators instead of importing and increasing the fine plums of France, appear to be satisfied with the miserable trash that grow unheeded and uncared for in thickets. This negligence is reprehensible and ought to be corrected.

A FRENCHMAN.

From the Charleston Mercury.

WHITTEMORE'S IMPROVED COTTON GIN.

We had the pleasure the other day of examining the gin described in Mr. Whittemore's advertisement, and observing its mode of operation; and we would advise every Sea Island planter in the city to go and do so also. The advertisement falls short of justice to the simplicity and completeness of the mechanism, which is admirable throughout. The cotton is ginned without breaking the seed or injuring the staple, the rollers being preserved from being heated by friction rollers. The moving power is applied somewhat on the principle of the treadmill, the horse or ox being placed upon a revolving floor which moves from the weight of the animal, and obliges him to keep his feet in motion. By this means the motive power is communicated by the use of the endless chain to the cylinder above, to which the wheels of the gins are similarly attached.

One of the gins is made to work either by the treadle, or by the machinery; and it is very far superior in every respect to the common foot gin. As far as we are judges, it is altogether the greatest improvement on the Sea Island cotton gin that we have seen. The moving power may be used with ease for other purposes, such as to work the thrashing machine, for which purpose it is in extensive use by the northern farmers.

The advantages of these gins, are the following:—greater durability—less liability to get out of order—getting out more cotton in a shorter time, and cleaner, than any previous invention. The trifling expense, and great ease with which they are propelled; the very small space occupied by the whole machinery; the prevention of all heat from friction, the cotton does not "backlash" or wind and entangle itself round the rollers; all the parts subject to wear are of cast steel: they can be worked by the treadle or by horse power, at pleasure; the rollers can be taken out and replaced in one gin, without interrupting the works of the others, and the ginner need not be detained more than two minutes while it is doing.

But the planter need but visit it to be convinced of its important advantages over the gins in common use on our plantations.

ON THE SOILS AND AGRICULTURAL ADVANTAGES OF FLORIDA.—No. I.

To the Editor of the Farmers' Register.

Plantation Wascissa, Florida, 6th June, 1835.

Though unknown to you, I shall not apologise for this intrusion upon your attention. The spirit of your widely circulating Register, solicits the contributions of all farmers, and though a very humble one, I do not hesitate to exercise this privilege of my vocation. Another ambition also incites me to write publicly—it is, to promulgate throughout the exhausted districts of the more northern and densely populated states, the increasing value and prosperity, in lands and health, of this territory; and to counteract, by the simple statements of personal observation, the influence of exaggerated reports, which have for some years so materially checked the advancement of Florida, and turned from her the flow of northern emigration. Abler pens would doubtless accomplish this object with more elegance of diction, as well as with more successful results; but in their indolence, truth, though uttered with simplicity, may prove sufficiently interesting, to pardon the officiousness of my egotism.

I have taken with increased gratification the last two volumes of your valuable periodical, and faultless as it is, I would suggest with deference, your devoting more of its columns to agricultural practices and improvements, adapted to the "*far south.*" We are here extremely limited in book farming, and generally ignorant of "making two blades of grass grow where one grew before"—and conceiving that with you lay the ability of instruction, I have regretted that so much of your publication could not be practically applied to our new lands, and *pioneering* systems.

Some two years since I came first to Florida, after a residence of some years, as a sugar planter, in the British West Indies; from whence I was forced, with a sacrifice of property and prospects, by the mad abolition act of the infatuated English government. My object in selecting Florida as a residence, was to establish, under a secure and honest constitution, a sugar growing estate: and before I conclude these letters, (to be only continued under your approbation,) I shall express my opinion and experience as to its practicability. At present, I shall endeavor to describe the character of the various soils, peculiar to the different sections of this valuable and little known peninsula, which I have visited—commencing at the Atlantic shore, and proceeding westward.

The territory of Florida is divided into four grand districts, each of which are subdivided into counties—as it is of the "districts" I shall speak, I will briefly detail their respective limits, and appellations. The eastern district, commonly called

East Florida, extends from the Atlantic, westward, to the Suwanee River, and as far south as the parellel of 27° latitude. The middle district, known as Middle Florida, is comprised between the Suwanee and Apalachicola Rivers. The western district, or West Florida, from Apalachicola to the Perdido River—and the southern district includes the extremity of the peninsula below twenty-seven degrees, and the fortifications on Key West. The distinctions of arable soil to be found in the eastern section, are between the high hammocks or uplands, and the swamps or low bottoms. The former are chiefly composed of a gray vegetable mould, mixed with white sand, and based on beds of indurated or stone marl, in such abundance, that it rises in layers or shelves on the surface. This excess of lime I hold to be the destructive quality of these lands; for I conceive, that though marl in all its varieties is, under proper proportions, an auxiliary to soil, it is, when in excess, and solely uniting with silicious land, detrimental to production, and extremely injurious. Clay, or other absorbent, is essential for decomposing and imbibing the generic heat of calcareous matter; without it, lime, in excess, "consumes the meat it feeds on;" and by its continued thirst, creates the destructive effects of drought. The growth on these lands in the east, is indicative of this fact—being a stinted production of dwarf or scrub oak, and the steril palmetto. They are notwithstanding generally cultivated, and yield cotton productively for three or four years, or as long as the vegetable moisture exists; but at the expiration of that time, they become dry, glazed, volatile, and unprofitable. Corn cannot be grown profitably at any time; and sugar being of the same genus, is difficult of culture. The richness, however, of the bottoms or swamp lands in this section, more than compensates for any deficiency in the uplands. They extend variously from a half to three miles from the margin of the creeks and rivers, lying perfectly level, and covered with a dense growth of forest trees, interlaced with innumerable grape and other vines, and in some instances, breast high with luxuriant and never dying grass. They are purely alluvial, and formed solely on viscous soluble marl, by the gradual deposite of vegetable matter held in the overflowing waters. They would, of course, require ditching and drainage to be fit for cultivation, and this is most feasible: and once accomplished, would forever secure an inexhaustible and inestimable soil. The owners of these bottoms are fully aware of their value, but the want of labor, and the "thousand and one" difficulties to be executed on a new settlement, have compelled them to cultivate, as yet, almost entirely the more easily cleared uplands. Some have, however, succeeded in bringing the swamps into culture already, and the luxuriance of the sugar cane crop upon them, has more than justified their expectations—2000 lbs. and upwards, per acre, of muscovado sugar has been averaged from a thirty acre field. I may respectfully mention General Hernandez, (one of the few remaining Spanish grantees now amongst us,) who has with great perseverance and success, overcome the laborious difficulties of clearing and draining new land; and has now under culture, upwards of 200 acres of these swamp lands, constituting by far the most valuable plantation, as respects soil, in Florida, and equally as healthy as any other to his slaves. I may convey some idea of the comparative value of these redeemed marshes, in stating that a late appraisement made over Gen. Hernandez's estate for banking purposes, estimated his cleared swamp at $80 per acre, while similar appraisements elsewhere of the finest upland, has only reached $15 per acre. I express myself strongly respecting these swamp lands, on the conviction that they must ultimately become the chief sugar growing lands of these states. They lie immediately on the sea board, between latitude 29 degrees, and as far south as the surveys of the peninsula have gone. They have many advantages over the Mississippi bottom lands, as regards climate, health, and proximity to the northern markets, and nothing is wanting to exhibit their greater value, save capital and labor. Now that there is a probability almost reaching a certainty, that the supply of sugar will continue for some years less than the demand, it would be well for the capitalists of your state to turn their attention to its manufacture—and I speak from personal examination in saying that the swamp lands of East Florida, and especially those lying on the branches of the Matanza and Halifax Rivers, are superior in strength and character for the production of sugar, to the most valued lands of the West India Islands—only excepting the ashy loam of St. Kitts. The little success which has as yet attended the planters of the east on these swamps, is entirely owing to a misapplication both of money and labor: and must not be taken as an evidence at all of the land, except to show that had the lands been *bad*, under the same want of practical husbandry, the cultivators would ere this have become beggars.

Extensive tracts of land are yet in the market, comprising large proportions of these "bottoms;" though the late organization of an "Union Bank," with its issue upon landed security, has enhanced their value. The health of such low grounds beneath a tropical sun, cannot be justly eulogised, although with the exception of the "dog days," they may be denominated safe and agreeable residences; and during those trying days, St. Augustine, so justly famed as the Montpelier of America, affords a most fascinating retreat, with

Its sweet orange groves—and evergreen bowers—
And the atmosphere loaded with the breath of their flowers!

It has been, sir, a source of much regret, that limited means have compelled me to forego a settlement on these inexhaustible mines: but alas! like Shakspeare's apothecary, "My poverty but not my will consents." It has been a serious obstacle to the advancement of our sugar plantations that most of our planters have commenced them without adequate resources. It may be advantageous and desirable that a cotton farmer should not have too much wealth: the operations of his estate can be successfully executed without any expensive machinery, or large outlay of dead capital. Not so, however, with a sugar plantation—the salvation of its crop, and its profitable manufacture, are dependant, in *this climate* of variable and *limited* autumn, upon effective and sufficient machines—all of which cost much in material, in construction, and most in erection and application. Yet how few calculate this necessary and preparatory outlay! But of this, more anon. I must conclude this *essay* upon your time and space, lest besides its many faults, its length should add to render it unworthy a "second reading." I trust that it may be acceptable: if so, I promise myself the pleasure of again writing for a future publication, and to continue these letters upon the other sections of Florida which I have visited, until, Mr. Editor, my observations, or *your* indulgence shall become exhausted.

FARQ. MACRAE.

[It would be a superfluous declaration on our part, that further communications from the writer above, will be acceptable and gratifying, but for his expression of doubt on that head. His continuation of this particular subject is requested as early as it can be furnished—and future communications on any other subjects, as the writer's leisure may permit.

We share with our correspondent the regret that more space in this journal has not been given to the agriculture of "the far south," and to the management and lands of the newly settled country. But the fault is not *ours*—and the acknowledged deficiency will soon be filled up, if only a few more of the intelligent cultivators of those regions, were, like our correspondent, sensible of the general want of such information, and would come forward and communicate their own respective acquisitions. Such communications would serve as seed to produce many others in due time—and the harvest of gain would be sufficiently abundant to reward all who aided in the labor, whether they commenced at the first or the "eleventh hour."

But while admitting the alleged deficiency of articles especially relating to the agriculture of the far south, and still more of newly settled lands, it may be justly claimed that we have paid far more attention to those regions than their cultivators have to our work, or to the promoting of their own interests by making proper use of it. Compared to the small amount of the subscriptions, and of the more valued written contributions to the Farmers' Register from the southern cultivators and pioneers, at least as much of its contents have been devoted to their peculiar interests, as to those of any other part of our country. It is to be hoped that more correct views are slowly extending—and that southern planters, both on old and new lands, will know that both their pecuniary and political interests, may be better sustained by aiding the hitherto weak, but zealous efforts of this journal.]

From the Richmond Compiler.

HYDRODYNAMIC RAILWAY, OR THE APPLICATION OF THE POWER OF RIVERS TO THE RAPID AND CHEAP TRANSPORTATION OF PRODUCE AND MERCHANDIZE.

It has long been with me a matter of doubt, whether the water used in the lockage of canals was not in many cases an injudicious application of a valuable power, as in the case of a canal located along the valley of a great river having considerable fall in its bed, like that of the river James, which has 1222 feet fall from the Covington to tide-water, or about 4.74 feet per mile, rendering at least one lock necessary for every two-miles in the average.

On investigating the subject, I find that the water power of the river is of itself equal to the transportation of a greater quantity of tonnage than can be passed through the largest canal, and this too with the astonishing rapidity peculiar to rail roads.

I will therefore lay before you, in as succinct a manner as possible, this new, though simple, deduction of science.

The locks of the Chesapeake and Ohio Canal are 100 feet long, 15 wide, and, say we take one of the most approved lift, 8 feet, the "prism of lift" will then contain 12,000 cubic feet of water, which will weigh 750,000 pounds. Every time the lock is emptied, this quantity is transferred from a superior to an inferior level. If the valves are opened simultaneously, I am informed that the lock can be filled and emptied in little more than two minutes; but say that it takes three. Now, this water is power, and if it were applied to a properly constructed "breast wheel," or where the fall of water is greater, to a "pitchback," we should have four-fifths of it available to set any machinery we think proper in motion. Let it be applied to an endless chain or rope, passing over suitable rollers along the line of a railway, after the manner of the stationary system of steam engines, we shall have a water power railway, entirely free from the objections that can fairly be urged to the stationary steam engines, of the necessity of keeping up the fire and steam, &c.

When the stations are two and a half miles apart, one-twentieth of the power, according to Tredgold, will be expended in moving the chains; but I will allow a tenth of the power to effect this object on two mile stations, the chain being worked but for one mile.

We have then the four-fifths of 750,000 pounds, (the one-fifth being lost in the application to the water wheels) equal, 600,000 pounds, which, falling 8 feet in three minutes, is equal to 1818 pounds moved half a mile in the same time; which is at the rate of 10 miles an hour. Deducting from this the one-tenth, as that part lost in moving the chain, leaves 1637 pounds. And as 10 pounds are equal to the transportation of a ton, with the commonest railway wagons, it follows that the above power is equal to the transportation of 163.7 tons over half a mile of the road, while a boat would be passing through the lock of the canal; or it will transport 81.8 tons over a mile of the road in the same time, which is at the rate of twenty miles an hour!

But the maximum rate of transportation on canals is $2\frac{1}{2}$ miles an hour, and as the mass moved is inversely to the velocity, we shall at this rate be able to transport 654 tons.

The water used would be at the rate of 66.6 feet per second. James River, even at Covington, in a dry season, yielded nearly three times this quantity, as appears from the Report* of Mr. Crozet, who measured Jackson's River and Dunlop's Creek in August and September, 1826. The mean of the results obtained by this engineer is 177.6 cubic feet per second, or 10,656 feet per minute; and we have this quantity with 7.11 feet fall per mile, the average down to Pattonsburg; before reaching which, however, the volume of water is more than double; and as we descend the river,

* 5 Vol. Board of Public Works, page 108.

although we have less fall per mile, we have at least six times the quantity of water to compensate for it; and the fall is still about 3½ feet per mile.

The heavier trade being descending, will add to the effect of this power; but disregarding this favorable circumstance omitting the decimals in the fall per mile, and taking the minimum quantity, we have 10,656 cubic feet of water equal in weight to 666,000 pounds, which if permitted, will of course fall the 7 feet in a minute, and is therefore equal to 4,662,000 pounds falling one foot. Deducting one-fifth for loss in application, leaves 3,729,600 pounds. Now the load we can transport will depend on the velocity at which we would travel—say that it shall be 10 miles an hour, which is 880 feet per minute.

Dividing 3,729,600 by 880, the quotient is 4,238 pounds, moving with the velocity of 10 miles an hour!

From 4,238 deduct the one-tenth part, for that lost on mile stations, in moving the chain, or rope; and dividing the remainder by 10 for the friction per ton of the carriages, and we have 381.5 tons transported at the rapid rate of 10 miles an hour!

And as each and every mile furnishes its own moving power, it follows that it is equivalent to keeping this quantity in motion on each mile throughout the line at the same time. And as the distance from Richmond to Covington is 257½ miles, this may amount to the enormous quantity of 98,236 tons; or to the transit and delivery of 3,815 tons hourly!

Having thus demonstrated the amplitude of this moving power, to an extent probably far beyond any demand we shall be able to make on it—which will be better understood by the general reader from the fact, that but 17 hours would be equal to the transportation of a greater quantity of tonnage than passed over the whole Baltimore and Ohio Rail Road in a year ending 30th September, 1833—it now remains to show that it can be employed at a reasonable expense.

The expense of erecting works for hydrodynamic transportation will depend on their scale, or magnitude, and on the greater or less permanent character of the materials used in their construction; also, on the extent to which we would employ the motive power. With regard to the latter, however, it should be observed, that we obtain it so cheaply, and in such excess, as to obviate, to a great extent, the necessity of expensive grading. This adaptation of fixed power to an undulating surface, of any degree of slope renders it peculiarly applicable to mountain localities, as by its means we can cross the bends of the river, thus shortening the distance, while a canal, or even an ordinary rail road for locomotives, should be conducted round them.

Another important advantage derived from the employment of this cheap power, is that we can substitute, for the iron rail, a broad granite tramway similar to that extending from London to the West India Docks; which, although it will cost more per mile in the first instance, yet it will have great permanency to compensate for this. But the most important advantage to be derived from the granite tramway, is, that any man may bring his own farm wagon, and, leaving his horses behind him be drawn to market at a rate of 10 or 20 miles an hour, which would be in less time than would be spent in passing the locks of a canal: thus freeing the work entirely from the odious charge of monopoly brought against rail roads.

To form an estimate of the cost, it will be necessary to suppose the works adapted to some definite amount of trade. Say that it shall be to the delivery of 100 tons per hour, or to the transportation of 50 tons at a time, at the rate of 10 miles an hour.

For this purpose I will suppose it necessary to erect a dam at every four miles; and that they may be built in the most substantial manner of stone masonry, I will estimate them at $10,000 each; the average width of the river up to the Blue Ridge is 699 feet; above the Ridge, it will only be 275 feet. For water wheels of the best and most durable construction, say $3000.

Thus we have 13,000, which, divided by 4 miles, gives $3250 per mile, as the cost of the moving power.

Estimate of the Expense.

Motive power, or proportional cost of dams per mile, - - -	$3,250
Ropes, a double line per mile, -	1,800
Rope rollers, put up, - -	850
*A broad granite, or marble tramway, double track, - - -	8,000
Grading and bridging per mile, say,	2,000
	$15,900
Add 10 per ct. for superintendence,	1,590
	$17,490

High and unfavorable as the above estimate is, yet the whole cost of the moving power, including dams, water wheels, ropes, and rollers, will be much less per mile than such locks as those of the Chesapeake and Ohio Canal, which cost, as I am credibly informed, $1500 the foot lift.

I have estimated for ropes, as they are in more general use than chains; and the above will be the cost of the newly invented rope, saturated with India rubber, expressly for this purpose; which is said to increase its strength as well as its durability.

When the stations or water wheels are placed 4 miles apart, each wheel would have to work 2 miles of the road at a time; but did the trade require it, double, or probably treble the foregoing tonnage could be delivered by erecting an additional water wheel at each station.

The following is the estimate of the amount of power to work the 4 mile stations, which those conversant with the subject will perceive to be very ample.

Friction and resistance of two miles of rope, - - - - -	600 lbs.
Ordinary friction of 50 tons of carriages and goods, 10 lbs. - - -	500 do.
Allowance for occasional gravity, at 20 lbs. per ton, - - -	1000 do.
Power allowed at the rate of ten miles an hour. - - - -	2100

* Wood and iron rail tracks, like those on the Petersburg Rail Road, could be laid in a double track for 6000 dollars a mile. They would last much longer than when locomotives are used.

2100 pounds moved 880 feet in a minute, is equal to 1,848,000 pounds moved one foot; which is equal to 154,000 pounds falling 12 feet in the same time, which is, also, equal in weight to 2464 cubic feet of water. To which add one-fourth, for loss in application, and we have 3080 feet per minute, or rather more than 51 feet per second.

For the sake of conveying an idea of the probable cost on a large scale, I have supposed isolated dams to be used at regular distances, but the engineer will of course adapt his works to suit particular localities, sometimes preferring a continuous canal, substituting water-wheels in place of locks, and thus discharging the water, as it is used, into the next consecutive reach below. Or where great length of level occurs, the wheels may be made to discharge their water into the river, to be again taken out of the next dam.

On canals already constructed, where they have considerable lockage, and plenty of water, it is obvious that the trackage may be effected by the foregoing means; that is, by erecting a water-wheel along side of a lock, and extending a chain down the margin of the canal on the one side, which would be returned up the other.

And as they no longer need the tow-path, they may lay a light rail track, on which passenger cars may be drawn by the same power at any required velocity.

But in many cases, where thay have not a superfluity of water, they had better substitute water wheels for their lock gates, widen their tow-path, and lay down a railway.

In conclusion, I invite investigation by men of science, as it is certainly a subject of great importance to the country, now so extensive engaged in works of internal improvement.

JAS. HERRON,
Civil Engineer.

Richmond, Va., May 26, 1835.

SPAYED COWS.

[While the foregoing sheet containing the French article on this subject was printing off, we discovered that the piece therein referred to was in one of the volumes of our library. It is here given entire. The piece stands in the American Farmer of 1831, as copied from the New England Farmer, probably of a date not much earlier, but not stated. If this piece had not escaped our memory its being presented would have rendered unnecessary the remarks in a proceeding part of this No.]

From the New England Farmer.

Mr. Fessenden.—Some years since, I passed a summer at Natchez and put up at the Hotel then kept by Mr. Thomas Winn. During the time that I was there, I noticed two remarkably fine cows, which were kept constantly in the stable, the servant who had charge of the horses, feeding them regularly, three times a day, with *green Guinea grass* cut with a sickle.

These cows had so often attracked my attention, on account of the great beauty of their form and deep red color, the large size of their bags and the high condition in which they were kept, that I was at length induced to ask Mr. Winn, to what breed of cattle they belonged, and his reason for keeping them constantly in the stable, in preference to allowing them to run in the pasture, where they could enjoy the benefit of air and exercise, and at the same time crop their own food and thereby save the labor and trouble of feeding them? Mr. Winn in reply to these inquiries, stated, that the two cows which I so much admired, were of the common stock of the country, and he believed of *Spanish origin*—but that they were *both spayed cows* and that they had given milk, either two or three years. Considering this a phenomenon (if not in nature, at least in art,) I made further inquiries of Mr. Winn, who politely entered into a very interesting detail, communicating facts, which were as extraordinary, as they were novel to me, and supposing that they will prove equally as interesting to your numerous agricultural readers, as they were to me, I am induced, on the request of a friend, to offer them for publication in your very valuable journal, in the hope, that some of the farmers who supply our large towns with milk, will deem them of sufficient importance, to make experiments for the purpose of ascertaining whether the results which they may obtain, will corroborate the facts stated by Mr. Winn, and which, should they be fully confirmed, may lead to great and important benefits, not only to farmers, but to tavern-keepers and other inhabitants of cities, and villages who now keep cows, in order that they may be sure of a constant supply of *pure* and *unadulterated* milk.

Mr. Winn, by way of preface, observed, that he had in former years been in the habit of reading the English Magazines which contained accounts of the ploughing matches which were annually held in some of the southern counties of England, performed by cattle, and that he had noticed that the prizes were generally adjudged to the ploughmen, who worked with *spayed heifers*—and although there was no connexion between that subject and the facts which he should state, it was nevertheless the cause which first directed his mind into that train of thought and reasoning, which finally induced him to make the experiments which resulted in the discovery of the facts which he detailed, and which I will narrate as accurately as my memory will enable me to do it, after the lapse of more than twenty years.

Mr. Winn's frequent reflections, had (he said) led him to believe—"that if cows were spayed soon after calving and while in a full flow of milk, they would continue to give milk for many years, without intermission or any diminution of quantity, except what would be caused by a change from green to dry or less succulent food."

To test this hypothesis, Mr. Winn caused a very good cow, then in full milk, to be spayed; the operation was performed about one month after the cow had produced her third calf; it was not attended with any severe pain or much or long continued fever; the cow was apparently well in a few days and very soon yielded her usual quantity of milk and continued to give milk freely, for several years, without any intermission, or any diminution in quantity, except when the feed was scarce and dry—but a full flow of milk, always returned, upon the return of a full supply of green food. This cow ran in the Mississippi low grounds or swamp, near to Natchez, got cast in deep mire and was found dead. Upon her death, Mr. Winn caused a second cow to be spayed, the operation was entirely successful, the cow gave milk constantly for several years—but in jumping a fence, stuck a stake in her bag, that inflicted a severe wound, which obliged Mr. Winn to kill her. Upon this second loss, Mr. Winn had two other cows spayed, and to prevent the recurrence of injuries from similar causes with those which had occasioned him the loss of the two first spayed cows, he resolved to keep them always in the stable, or some safe enclosure and to supply them regularly with green food, which that climate, throughout the greater part, if not all the year, enabled him to procure.

The result in regard to the two last spayed cows, was, as in the case of the two first, entirely satisfactory, and fully established, as Mr. Winn believed, the fact, that the spaying of cows, while in full milk, will cause them to continue to give milk during the residue of their lives, or until prevented by old age.

When I saw the two last spayed cows, it was I believe, during the third year that they had constantly given milk, after they were spayed.

The character of Mr. Winn, (now deceased) was highly respectable, and the most entire confidence could be reposed in the fidelity of his statements, and as regarded the facts which he communicated in relation to the several cows which he had spayed, numerous persons with whom I became acquainted, fully confirmed his statements.

At the time to which I allude, I endeavored to persuade Mr. Winn to communicate the foregoing facts to the late Judge Peters, then president of the Agricultural Society of Pennsylvania. But he was restrained from complying with my request by an extreme unwillingness to appear before the public, and peradventure, his discovery might prove not to be new, as doubts in regard to the facts, might, where he was unknown, subject him to some degree of ridicule.

The many and great advantages that would result to the community, from the possession of a stock of cows, that would be constant milkers, are too obvious, to require an enumeration.

Should gentlemen be induced from this communication, to make experiments, they will find it better to spay cows which have had several calves, rather than heifers, as at that age their bags are usually large and well formed, and are capable of carrying a much greater quantity of milk (without pain and inconvenience,) than younger animals.

VIATOR.

From the Richmond Enquirer.

PROCEEDINGS OF THE DIRECTORS OF THE JAMES RIVER AND KANAWHA COMPANY.

The Board of Directors re-assembled in this city on the 17th inst: Present—Joseph C. Cabell, President, John H. Cocke, Sidney S. Baxter, Randolph Harrison, Samuel Marx, and Richard Sampson. The Board continued its session for two days; and after rescinding the previous order for a meeting on the 24th inst., adjourned to the 17th of July. A variety of business was transacted at the last meeting; but the attention of the Board is understood to have been chiefly engaged in organizing the Corps of Engineers. That organization was effected, so far as it was required to prepare the First Division of the Canal for immediate execution; and it was framed upon consultation with Judge Wright, of New York, who was in attendance by invitation of the President, under authority given at the previous meeting of the Board. The Corps of Engineers will consist, for the present, of an engineer in chief, three assistant engineers, three surveyors, six rodmen, and six chain-carriers. It will be divided into three divisions, each consisting of one assistant, one surveyor, two rodmen, and two chain-carriers. The line of canal from Lynchburg to Maiden's Adventure, will be divided into three sections: one extending from Lynchburg to Tye River, another from Tye River to Scottsville, and another from Scottsville to Maiden's Adventure. A division of the corps, will be assigned to each section of the line, and they will commence their action about the same time, and as soon as practicable, and locate downward. Each assistant engineer will have authority to employ two axemen, and each division will be attended by a covered boat, conducted by a boatman, who will act also as cook to the party: and will also be furnished with a cooking apparatus, and with tents, for the purpose of encamping at night upon the hills, and beyond the reach of the dews and the fogs of the river. The residue of the furniture of the boat, as well as their provisions and instruments, will be furnished by the members of the division, whose compensation is regulated with a view to that object. The boat attached to each division will slowly descend the stream, keeping abreast of the party as the location proceeds, so as always to be within convenient distance of the division.

Benjamin Wright of New York, is appointed engineer in chief; and although he reserves his final acceptance or non-acceptance till after his return to New York, there are the best grounds for the belief that he will accept the appointment. This distinguished engineer, whose services are so extensively sought for, was already under extensive engagements, leaving him about one-third of his time for the residue of the current year, and two-thirds in future years. The latter proposition, it is hoped, may be reduced to three-fourths, by a compromise with the companies to which he stands engaged. The periods of his absence in future years will be selected with reference to the convenience and interests of our work, and upon consultation with the president of the company. His salary for the residue of the present year, will be at the rate of $3000 per annum. For future years, it will be at the rate of $5,500 or $6,000 per annum, just as he may spend 8, or 9 months per annum in the service of the company. This rate of compensation may appear to be high to those at a distance from the great lines of improvement, but will be deemed very reasonable and moderate, to those acquainted with the high profits of the profession, and the vast importance of professional skill, in works involving the expenditure of millions. The most eminent engineers in the United States are in the receipt of from $10,000 to $15,000 per annum, for the various lines under their care, and in the habit of receiving $5,000 for laying out, and making an occasional visit to a single line. In the selection of his *three first and principal assistants*, and in the adjustment of the amount of their salaries, Judge Wright is understood to have expressed a particular wish to be consulted, in which he was gratified by the president and directors. This proceeded from the very great importance to himself and to the Company, that he should be aided by tried and skilful assistants, upon whom he could implicitly depend in the location of the canal.

Charles Ellet, Daniel Livermore, and Simon W. Wright, were elected assistant engineers, each with a salary of $2,000 per annum. It is understood that these engineers are of many years' experience in the line of location, and that these are the rates of compensation which some, if not all of them, are now receiving elsewhere, and the least for which their services could be procured.

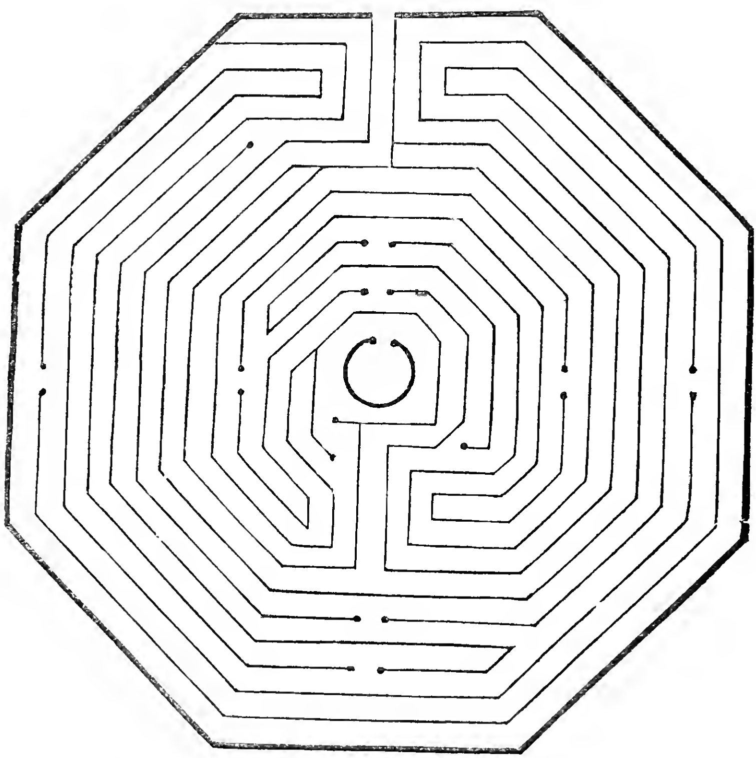
The surveyors, rodmen, and chain-carriers, will be appointed by the president, in conjunction with the assistant engineers. It is understood that those appointments will be speedily and advantageously filled, from a list of numerous applicants from within the limits of the state, who are well educated and seek to enter the profession of engineering with a view to future distinction, as well as the means of subsistence.

It is hoped that the whole corps will be organized and equipped for the field by the 15th July, and that the three divisions will be in motion by the 20th of the month.

For the Farmers' Register.

PLAN OF A LABYRINTH, FOR A PLEASURE GARDEN.

The plan below, will probably be found to accord with the object in view more completely than would be supposed possible from employing so few lines, and in so small a space as this might be constructed on. The difficulty here designed, (like that of the labyrinth within which tradition tells that Fair Rosamond was concealed,) is to find the way *in*—and not *out*, as was the difficulty in the Cretan labyrinth. Indeed, one part of the purpose and effect of this is to bring the seeker frequently outside of the entrance, when he supposes he is making fast progress towards the centre. If on this plan a labyrinth was constructed by walls or paling, with passages of sufficient width, it would not cover a quarter of an acre: and if constructed in a public pleasure garden, of a city, would serve to furnish as much amusement to visiters, and profit to the proprietor, as could be obtained at no greater cost.



COMPARATIVE VIEW OF THE AGRICULTURE OF VIRGINIA AND THE NORTHERN STATES.

To the Editor of the Farmers' Register.

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When I began this letter I did not think of writing on any other matter than the one I have mentioned, but while I have my pen in hand I will add, that though I highly approve the general conduct of your publication, and I find a remarkable coincidence in our opinions on agriculture. I occasionally meet with some very fanciful, and, as I think, some very erroneous opinions among your correspondents. This I know cannot be avoided in such a work, and perhaps if it could, it ought not to be: as arguments on different sides of a question often aid in coming to a right conclusion. But I think that a greater number of your correspondents than I could wish, seem disposed to compare our agriculture with that of the northern states, much more unfavorably than is warranted by facts. In page 730, Vol. II, I find a very neat and well written article by a correspondent, on the agriculture of Rhode Island. A few years since I spent a part of the hot season in that delightful spot, and do not wonder that he is so much enamored with it. The scenery is beautiful; and the morning fogs, and cool and moist breezes from the ocean cover their meadows and pastures with verdure; but I did not think their agriculture superior, nor indeed, by any means equal, to that of the generality of fertile and well managed estates in Virginia. That their crops of onions and potatoes are much better than ours, is, I think unquestionable; and this I believe is mainly owing to the climate. Their onions, which are a field crop, are sown in the spring, throw out a great number of offsets that cover the ground, and do not come to maturity till the cool weather of autumn sets in: they will then bear transportation to the New York and southern markets. The onion with us is of no value but as a garden crop. It must be sown late in the season, and the button onions transplanted in the spring; they make very few offsets, and come to maturity in the heat of summer. They must then be gathered, and being subject to rot at that season, it is with much difficulty that a small supply can be preserved for family use. As to potatoes, which are a valuable crop in Rhode Island, and shipped from thence in large quantities to different markets, I think they are of no value with us except for the table, and then chiefly for use in summer, and a little later.—In the autumn and winter they are very inferior to those we get from the north. This difference I think, is owing to climate. If planted in the spring they come to maturity, like the onions, in the heat of summer—are preserved with difficulty, and are besides, except early in the season, of a very inferior quality, hardly fit for table use. At our Virginia springs, and in the recesses of the Allegany, I think the potato is decidedly better than in Rhode Island or Connecticut, and only inferior—if it be inferior—to those that are brought from Liverpool. This difference too, I think, attributable to climate—the summers being generally cooler in our Allegany country than in those parts of New England.

As some time has passed since I was in Rhode Island, I hope their agriculture has since improved—there was certainly much room for it, and I cannot otherwise account for the very favorable view your intelligent correspondent has taken of it. The pastures, (which were well stocked with sheep as well as horned cattle,) and their meadows were, I think, pretty free from annual weeds, as lands that have been long in grass generally are; but both appeared to me to be in a rather slovenly condition, with a good deal of "rubbish, briers, bushes, &c." in spots. Their ploughing I thought decidedly inferior to ours; nor did I wonder at it—their ground being much encumbered with stones, and their ploughs drawn sluggishly and heavily by oxen. With regard to their crops of corn, I agree with your correspondent in thinking them very good; but they did not appear to me to be in as clean order as ours generally are on our best, or even on our inferior lands. This perhaps was owing to the moisture of the climate favoring the growth of weeds. I observed the hills of earth round the corn which he mentions, a fashion which formerly prevailed in this country, and has long since been changed, I believe with good reason—and supposed it might probably be a good practice on lands unsheltered by woods, and exposed to tempestuous winds from the ocean. I can easily believe that the crops occasionally amounted to ten barrels the acre, and think it not more than ought to be made on lands originally strong and manured "*ad libitum*" as well by the marine weeds your correspondent mentions, as by the large stocks of cattle, sheep and hogs which are kept on the island, of which it appeared to me that at least five-sixths were in meadow and pasture. Without controverting the account your correspondent gives of the produce to the acre, I can say for myself, that in travelling through the northern states, and in our mountain country, I have seldom if ever been able to get any other than conjectural accounts. Ask a farmer in Pennsylvania or our mountain country, how much wheat he made for market the last year, and he will tell you to a bushel, for he has his miller's receipts for the whole: but his corn being got out at different times, as leisure from the other business of his farm admitted, and not being regularly measured, he can seldom give any certain account of it.

As to the rare-ripe corn planted in Rhode Island, it is no doubt suited to that climate, as our good old fashioned gourd seed is to ours. If we were to plant their sort, and they ours, I think both would fail in a crop.

I take it for granted the implement for raking stubbles, of which your correspondent gives a cut, is unknown in his part of the country, and probably in other parts of Virginia; and he has acted properly, and I hope rendered a service to those districts, in publishing an account of it. In my neighborhood, just such an one has been long and pretty generally used on the large wheat plantations, and I think a good deal of wheat may be saved by it if the season has not been so wet as to injure the wheat lying scattered on the ground.

I trust you will not understand me as being disposed to to censure your correspondent in any particular. He is evidently a very intelligent person, and I doubt not, writes with perfect candor. Indeed I should not have thought of mentioning to you any difference between his opinions and mine, if mine had not been different from those of many of your correspondents in regard to the superiority of the agriculture of the northern states over ours. I have more than once gone over the usual track of travellers in New England, New York, (except its rich western country,) Jersey, and Pennsylvania, and have long been of opinion (perhaps erroneously) that except from the farmers, generally Dutch, on the rich lands of Pennsylvania, we have little to learn at the north in the management of our usual crops. I have seen a great deal of as good ploughing in Virginia as I have ever seen at the north, and I think we can fairly compete with them in the whole management of our grain crops. Still I freely admit that with us there is great room for improvement.

It would give me great satisfaction to be able to hold the opinion of numbers of your correspondents, that the soil of our middle and lower country was originally, in general, a fertile one, and that it is steril only through bad management. That there were, and now are, in both these districts, considerable tracts of rich land, I freely admit, and I wish I could persuade myself that this is the general character of our soil: but I have long thought that the very indifferent crops that we raised on a great portion of our lands are so, as much or more, from the land being infertile, or from bad cultivation. As a great part of the country is still covered by its native woods, it seems to me unquestionable that these lands are generally in the same state with regard to fertility, that they were at the first settlement of our country, and any person at all capable of judging, would, from the growth of wood on them, at once pronounce them to be naturally infertile; and if, not regarding these indications, he should examine the soil and find it thin, light, and sandy, or a stiff pipe clay, or gravel, and on investigating the sub-soil in ravines and gulleys, he should find it sandy, gravelly, or resting on sandstone or granite, he would come to the same conclusion. There are, however, some circumstances in favor of this, comparatively, unproductive soil. It generally lies well, is free from stone, and is easily cultivated. I may very probably be mistaken, but I have long thought that our climate is a very favorable one to grain crops, especially Indian corn, which is so valuable, and so productive.

With these views I am far from despairing of the improvement of the soil of lower and middle Virginia. Our rich alluvial soils, though they do not form a large proportion of the whole, are of considerable extent. So far as I am acquainted with them, they are generally well ploughed, and the crops well managed. The greatest fault in the husbandry of these lands, as I think, is the perpetual recurrence of exhausting crops, and in most instances, (though there are numerous exceptions,) a want of due attention to the collection and application of manures. A great proportion too of our higher and less fertile lands I think are capable of great improvement. The inexhaustible beds of the richest shell marl which have been already found in almost every part of our lower country, and which I am persuaded are but a small proportion of those that actually exist, with the aid of animal and vegetable manures, will by degrees fertilize this district; and I hope you will see the day when this improvement, to which you have so largely contributed, is extended through the greater part of it.

Our middle country, notwithstanding some slight indications to the contrary recorded in your Register, I fear is generally destitute of marl. This range of country commonly rests on granite or other rock that I believe geologists denominate primitive, and I understand that marls do not belong to this formation. I believe that limestone has not been found in this district, except a small stratum that runs through the country about twenty-five miles from the Blue Ridge, and nearly in the same direction. However, the soil of the middle country being generally stiffer than that of the lower country, is better suited to clover, and much may be done toward the improvement of this region by crops of clover, aided by gypsum, with animal and vegetable manures. A practice (whether a new one or not, I cannot say,) is now gaining ground in a part of it, probably not elsewhere, of top-dressing wheat, as well after, as at the time of seeding, with the farm-pen and stable manure; and I am assured that clover seeded on it in the spring, even upon thin land, seldom fails to turn out a heavy crop. Still whatever plan of improving on our less fertile lands is adopted, I am fully persuaded that a rapid succession of exhausting crops will soon return them to their original state, or reduce them still lower, unless they are kept up by liberal supplies of manure.

Having already advanced the opinion that our agriculture, so far as it relates to the management of our usual crops, will bear a comparison with that of the northern states in general, I ought perhaps to advert to one point of comparison in which the agriculture of the New England states, a great part of the other northern states, and of our mountain country, has the advantage of ours in the middle and lower country. The climate of those regions being cooler and more favorable to the growth of herbage than ours, and a great proportion of their soil being very hilly, or encumbered with stones, it is less suited to the plough. It is a natural and almost necessary consequence, that pastures and meadows should occupy a much larger portion of their land than of ours—that they should have much larger stocks of cattle—and a much smaller proportion of their soil being under the plough, they are able to manure it much more heavily than we can possibly do. In New England, we seldom see a field of corn that is not highly manured: our very extensive fields get little, and much the larger part no manure at all. Their crops, of course, ought to be much heavier than ours. This difference then, between their system of agriculture and ours, seems to be mainly owing to natural causes, that are, in a great measure, beyond our control. Both our climate and soil being better suited to the plough than to pasture, our course of husbandry is, I am afraid, necessarily an exhausting one; and though we may countervail this tendency in some degree, I have never heard of any system of management, that in my opinion, seemed likely to do it effectually. The plan that is most generally approved, is to keep the arable lands that are at rest, free from the tooth and hoof of stock; and as all our cleared lands are arable, to have as small a number of sheep and cattle as possible—and that small number is generally deemed injurious to the soil. I am persuaded that our arable lands, during the short periods of rest that are allowed them, will be better able to bear a new succession of scourging crops if the natural grasses with which they clothe themselves, or the clover that is sown on them, are suffered to grow and decay without being fed off. But I believe none but our most fertile lands can be improved, or even kept in heart, by this course of husbandry, and that the less productive lands can only be improved under such management by manuring: and how is manure to be obtained without stocks of cattle? It may be urged that straw, corn-stalks, leaves, &c. will furnish as large a supply of manure, if spread on the ground, without having been used as litter or food for cattle. This is contrary to general opinion in England, and the other well cultivated countries in Europe; and I think it will be admitted, that vegetable substances are more speedily brought into a fit condition for manures, by being trampled and fed on by cattle, than if left to natural decay. It seems equally clear, that animal manures are much stronger than vegetable. Inclining as I do to these opinions, I am disposed to think, that in avoiding, as far as is practicable, the pasturage of cattle on arable lands that are under cultivation, during the short periods that they are at rest, it would be a good practice to lay off a part of the cleared land of a plantation for a standing pasture, selecting generally that portion that is least suited for grain crops, and to keep on it as large a stock of cattle as it will maintain during the season of pasturage, and as can be provided with forage from the plantation for the rest of the year. It is hardly necessary to add, that while the horses and mules are well littered, and well fed in stables, the cattle ought to be treated in the same way, in well sheltered pens, either permanent or moveable, as is thought most convenient, but so situated that the liquid manure cannot run off and be lost.

With regard to the proportion of a plantation to be laid off for a standing pasture, each case must depend on its own circumstances; but I would not venture to recommend as a general practice, any great or sudden change, that would very much reduce the annual vendible products of the plantation. Though the ultimate object of agriculture, like all other pursuits of industry, is profit, which comprehends the improvement, and of course the increase in value of our land, most of us rely on the annual products for our support.

If this were written for publication, and should be inserted in your Register, I have little doubt that I should subject myself to the imputation of preaching heretical doctrines, in recommending an increased stock of cattle, and the high and most respectable authority of Col. Taylor would be quoted against me. Perhaps in defending myself, I might rely on the ancient adage "*Amicus Plato, &c.*;" but I think there would be no occasion for it. In the main, I agree with him, that arable land, when at rest in the course of crops, should not be pastured closely, if at all, and only recommend, under circumstances, such a stock of cattle to be kept in standing pasture, as will be nearly, or quite sufficient to consume the herbage of the plantation, and improve the quality, as well as increase the quantity of manure.

In the application of manures, I think some of our good farmers, in other respects, have much to learn. I have seen the bulk of the manure, on well cultivated plantations, applied liberally to galls, to remove an "eyesore," and to the thinnest soil of a field, to bring it on an equality with the more fertile part; though that too wanted manure to raise it to the proper standard of fertility.

It is a very general opinion, in which I heartily concur, that wheat husbandry cannot be conducted to advantage, unless clover is grown as a preparation for wheat, and a heavy crop of wheat can hardly be expected; except on rich land, unless it is preceded by a good crop of clover. But a small proportion of our land is strong enough to bring good crops of clover without the aid of manure, and I think it would be much better management, when there is not manure enough for a whole field to be seeded with wheat followed by clover, to apply it in sufficient quantities to a part of the field, and that not the worst, than to give a very light dressing to the whole field, which would only give a light scattering crop of clover. In the former case, a part of the land is at once brought to the proper point of fertility, and the residue in its turn may be treated in the same way. Whether the bulk of the manure should be applied to the corn crop preceding wheat, spread before the wheat furrow, or applied as a top dressing to the wheat, the manure will produce its effect in either way; but from what I have seen and heard, I am satisfied that a top dressing, at or after the time of sowing wheat, will insure a good crop of clover on lands that otherwise would not bring enough to deserve the name of a crop.

In different accounts that I have seen of Scotch husbandry, it is stated that the arable lands in that country having been generally much exhausted, a system of husbandry called, I think, the "in and out-field," was introduced. The in-field lots next the farm buildings, were heavily manured, and thrown into a separate rotation of crops. The out-field lands were occasionally cultivated for such crops as they could get with little or no manure. By degrees, with the aid of heavy crops of clover and increased quantities of manure, the farmers were enabled to extend their in-field lands, and now a great part of the arable lands in the low lands of Scotland are cultivated on the in-field system. A practice like this, I am told, has been followed in some parts of the northern states, and with like success. I understand too, that some of our most successful tobacco planters have laid off lots which they cultivate in a rotation of clover, wheat and tobacco, to great advantage.

I observe that for some time past, a controversy has been going on in your Register, with regard to the proper rotation of crops. This is one of those subjects on which "much may be said on both sides," and very judicious observations have been made by the advocates of opposite opinions. It must be admitted, that this is a subject of importance to our husbandry, but whether the three, four, or five-shift system is followed, there may be very bad or very good management with either rotation. On those plantations where wheat is a principal crop, if good crops of clover can be obtained, and a plentiful supply of manure furnished, good crops can be made on either system; though according to circumstances, one system may be preferable to another. Our kitchen gardens are constantly cultivated in a succession of crops, all more or less exhausting; but with sufficient supplies of manure, their fertility is kept up —without them, the soil would soon be worn out.

I cannot conclude this long letter, already by far too heavy a tax on your patience, without again adverting to the letter of your correspondent on the husbandry of Rhode Island. He says, "*I should think that one Rhode Island laborer would perform as much as two and a half southern slaves.*" Now there is nothing peculiar in this remark, as similar opinions with regard to the northern white laborers and our slaves, have been advanced in your Register, and so far as my memory serves me, without much, if any thing, being said on the opposite side of the question. I have often heard such opinions advanced in conversation, by highly respectable and intelligent persons. I think I have had sufficient opportunities of comparing these two very different classes of laborers, and right or wrong, though certainly meaning to be right, have long been of opinion, that man to man, our slaves perform as much or more labor, and perform it as well or better, than the laborers at the north, or at least beyond Pennsylvania. Without going into long details, let us look at general results. In the Blue Book (as it is called) for 1834, App. p. 34, is an account of the domestic exports of the United States, for the year 1832.

The agricultural exports are—

Product of animals,	$3,179,522	
Vegetable food,	352,494	
		$11,532,016
Tobacco, - - - -		5,999,769
Cotton, - -		31,724,682
All other agricultural products,		159,716
		$49,416,183

Thus we see that cotton, a product obtained wholly by the labor of slaves, was in 1832 largely over two-thirds of the whole agricultural exports of the United States; since that time the ratio has greatly increased. Add to this the tobacco, of which I am persuaded more than nine-tenths are produced by slave labor, and the vegetable food of which I think you will agree more than one-half consists of the wheat, Indian corn, and rice, raised by the labor of slaves. After this simple state of undoubted facts, can any judicious well informed person doubt that slave labor in agriculture is more efficient and productive in the southern states, than free labor directed to the same object at the north? Will it be said that the domestic consumption of the produce of our lands is greater than the export? Without denying this as a fact, I would ask what proportion of the bread stuffs, the rice, the sugar, and molasses consumed by the people of the New England and other northern states, to say nothing of tobacco, is the produce of slave labor at the south?

I may be mistaken, but it has long been my settled opinion, founded on full, and I hope impartial consideration, that there are few countries where agricultural labor, by the same number of hands, obtains as large and valuable products as the slave labor of the southern states.

This is not written, I assure you, in the spirit of controversy, but I hope from a better motive. It is right and proper that we should be stimulated to improvement in our agriculture, and there is too much room for it: but why should we so often be presented with so gloomy a picture of our husbandry, as compared with that of the northern states? It would not perhaps be too strong to say, as Mr. Jefferson said on a different occasion, "in this I neither recognise the portrait of ourselves, nor the pencil of a friend."

You will not understand me, I hope, as meaning to cast any censure on the northern husbandry. The farmers of New England, and the other northern states, whose management I have had an opportunity of observing, appear to me to be a class of men that would do honor to any country —steady, active and intelligent, their farm buildings, their implements, their working cattle and other stock, are generally in good order, and well attended to, and among them there are instances of farms well cultivated throughout, especially in the fertile valley of Connecticut River. But their husbandry in general did not seem to me to deserve this character. This I was satisfied, on inquiry and consideration, was owing to a course beyond their control. The scarcity, or in other words, the dearness of labor—a large proportion of their hands being employed in navigation and manufactures at high wages, farm laborers would of course require more for their services; and such neat husbandry as is practised in fertile and well cultivated lands in Europe, would cost more than its worth. They seemed to me, in passing through their country, to be careful, rather than laborious. The leisure of the shepherd and herdsman, and the toils of the plough and sickle, have always been a subject of remark, and a fruitful theme of poetry, ancient and modern.

For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

Agricultural produce generally continues to command high prices. A state of peace throughout the world has doubtless tended to increase the consumption of nearly all commodities, whether of luxury or necessity. The facility of intercourse between all countries opens new markets, and furnishes a greater variety of articles of commerce adapted to our wants, improvements, or inventions. For example, the increased use of iron for rail roads and other purposes is beyond computation— and to what various uses is ingenuity applying the formerly insignificant article, caoutchouc or India rubber!

The amount of domestic exports from the United States will be greater this year than in any former one. The value of cotton alone, at the high prices of this crop, will exhibit an amount nearly equal to the usual aggregate of all domestic articles exported. Although the quantity of cotton produced last year was full 50,000 bales more than in any former one, the demand has increased in a greater ratio, and the price it now commands (18 to 20 cents) is higher than at any period since the memorable and disastrous speculations of 1825. There appears to be no cause to apprehend a similar result during the current year; but as the extension of culture in the United States is annually very great, and the inducement of high prices must also increase the growth in other countries, the supply must ere long overtake the demand, and the price recede to a rate which will reduce the profit of cultivation to a level with that of other commodities.

Meanwhile, the emigration to the south-western states is immense, and the value of their lands, and of slaves to cultivate them, greatly enhanced. Virginia, and the Carolinas, supply so large a part of this population, as to diminish their resources, retard their prosperity, and reduce the value of landed property in those states, except such as is very productive, or favorably situated.

The cultivators of tobacco are, however, very amply remunerated for their labor, and with a considerable increase of the quantity produced, the price continues very high—25 to 50 per cent. more than for several preceding years—the extensive sales now made being at $6 to $17 per 100 pounds, and in some instances $20 to $30.

The price of wheat will no doubt be higher this season than usual; but the advance will scarcely be sufficient to compensate for diminished production in Virginia, where the crop has suffered greater injury than perhaps in any other part of the country.

In addition to the regular commercial transactions, which have been unusually large, a vast extent of speculation has also prevailed, chiefly in the northern and western cities and states. Landed property has there changed hands at prices far beyond what it had previously commanded. In the cities and their vicinities, the enhancement has been double, treble, even ten-fold, and fifty-fold in some instances. Population must increase with great rapidity, and the prosperity of the country be unchecked—or the value of money decrease by excessive issues of bank paper, to sustain such speculations—if former experience is any rule. The unfortunate result which attended a similar rage for property in Virginia some years ago, has probably operated as a warning against repeating the experiment here.

The stocks in the Petersburg, and in the Richmond and Potomac Rail Roads, have got into favor, both at home and abroad. The former paid a dividend of 4 per cent. for the last six months; and the stock has been sold in Philadelphia at $110 per share. In the latter company, on which $25 per share has been paid, an advance of $7 is obtained: the work is proceeding rapidly.

The transportation on the Petersburg Rail Road is steadily increasing, and the Greensville Road to connect with it, is now in the hands of the engineers. Works of a similar description, and to an immense extent, are in progress in every part of the Union, with the exception of North Carolina, where a favorable opinion of them begins to be entertained.

X.

June 25th, 1835.

SEASON AND STATE OF CROPS.

Accounts from nearly all quarters of the state continue to speak of the prospect of the wheat crop in Virginia as very bad. The only exception is from the Ohio River, on the borders of which the wheat is said to be good. The highest estimate that we have heard of elsewhere, of the probable amount of any farmer's crop, is two-thirds of an average. These estimates were for lands of very good quality—which, if our limited observations may be confided in, will withstand the inflictions of this year far better than poor and middling lands. We have on middling soil, (such even as most persons would consider as deserving a higher rank,) whole acres together on which the wheat is not worth reaping—indeed has almost disappeared: while on about 35 or 40 acres of very good soil, and after a clover fallow, the crop is excellent, and promises a fair return for the quality of the land. The price however, as of every other crop, will be much higher than usual, and in some measure compensate for the deficiency in quantity. In the few extracts from the letters of correspondents annexed, together with other matters, more full statements on this subject are made, and from some parts of the country not previously heard from.

STATE OF CROPS IN ALBEMARLE, AND THE VALLEY.

To the Editor of the Farmers' Register.

Albemarle, June 9th, 1835.

The prospect of the wheat crop in this county is really gloomy. The same causes which have produced the disastrous effects in other sections of the country have operated with us, to wit: the extreme severity of the winter frosts, and the unprecedented ravages of the Hessian fly. From my own observation, and the best information I have been able to collect, I feel confident that not more than one-fourth of an average crop will be made in the county. It is true, there are some instances where a large proportion will be realized—some a half, and perhaps a few favored ones rather more; while many others will scarcely produce more than the seed sown; so that upon the whole, I think my estimate of one-fourth of a crop, will be found not far from a correct one, judging from present appearances; but an unfavorable state of weather from this time until harvest, may even curtail the crop below that estimate. The harvest will be a very late one; little, if any, will be cut in this month—this being the fact, and the thinness of the crop on the ground, will render it more liable to receive injury from rust. I have had an opportunity of viewing the crops in the two adjacent counties beyond the ridge, Augusta and Rockingham, and I think the prospect in both were equally, if not more unpromising than in Albemarle. I understood from good authorities, that the failure was nearly general in all the valley from the Alleghany to the Potomac. The same unpropitious account will apply to all the counties I have heard from immediately below the ridge, as well as the counties south of James River from Lynchburg to Danville. It is said that the crops of wheat in the neighborhood of Charlottesville, are likely to yield a better crop than in any other section of the upper country. The corn crop is backward for the season, but now growing finely—oats promising—clover only tolerable. I hope the remaining part of the season will be more propitious for the farmer, and that we shall yet realize, if not an abundant, at least a saving crop of corn—so important under our present circumstances.

WM. WOODS.

USE OF CLOVER AND GYPSUM COMMENCING IN NORTH CAROLINA—STATE OF CROPS.

To the Editor of the Farmers' Register.

The perusal of your Register has induced me to commence some experiments on clover and gypsum, which, from present indications, promise to realize the most valuable results.

I have sowed about six bushels and a half of clover seed, (a large quantity for this section of country,) on about eighty acres of land, the greater part of which exhibits a luxuriant growth—that particularly which was sowed early, on land in wheat. That which was sowed with clover late in March, and harrowed, is not so good.

I have made an experiment with plaster and ashes mixed, with ashes alone, and plaster alone; the latter is evidently the best; the mixture next, and the ashes alone about equal to half of the quantity of the mixture. The experiments were made on an equal number of corn hills, with a given quantity of each of the manures, and on different soils.

I propose carrying out the experiments to the gathering of the fodder, and grain, the final results of which, with a more detailed statement of facts, I will furnish you.

The prospects for crops are, at this time, gloomy. Wheat (though better than some accounts state it to be in other parts of the country,) is far from being good. Mine is considerably blasted, and otherwise injured in the heads; perhaps by the chinch bug. Corn and cotton are generally unpromising, particularly the latter, which came up badly and stands worse. From present appearances, we calculate on a very short crop. Oats generally good, though suffering for rain.

Yesterday I cut my skinless oats, which were sowed a few days before I sowed the ruffle and common oats—none of which will be ripe enough to cut in a fortnight. To-day I have sowed a few of the skinless oats, cut yesterday, for the purpose of testing whether two crops of it can be made in this latitude in a year.

Only one of my pine nuts came up, and I fear that one will die. * * * *

W. B. LOCKHART.

Northampton Co. N. C., June 23, 1835.

EXTRACTS FROM PRIVATE CORRESPONDENCE.

Bertie County, June 1835.

Our crops at this place present a gloomy aspect at present. We have not had a "season" for four weeks. Our oat crop will be entirely cut off. Our corn is smaller for the present than I have perhaps ever seen it. Our cotton has come up badly. Some persons have had to plough up, and plant again.

Nansemond, June 18, 1835.

I thank you most sincerely for the present you sent me the other day, of your second edition of Calcareous Manures. So far as I have examined it, I find that the doctrines therein advanced are supported by my observation and experiments made with marl and lime, and I am clearly and thoroughly of the opinion, that we have within our reach an inexhaustible treasure—that our lands may be so improved as to yield an abundant profit, for any *reasonable* man. Let an *unreasonable* one go to the south, and speculate in the visionary schemes of the day, and either make his fortune, or get broke. * * * *

You can have no idea of the prejudices of many of my countymen against the improvement of the soil by means of calcareous earth, and though I have now a crop of wheat growing (upon land that would formerly bring nothing of value like wheat,) that would do any man good to look at, yet the people (save a few) will not believe that marl or lime had any agency in it—they say it was stable manure. What I shall make to the acre I cannot tell; but I verily believe 20 or 25 bushels to the average, and some 40 to the acre. It certainly is the best wheat I ever saw, either in eastern or middle Virginia, and gentlemen who pass the road from the mountains, say it is the best they have seen this year.

Brunswick, June 20th, 1835.

I am much indebted to you for the second edition of your Essay on Calcareous Manures; and whilst I am almost compelled to admit, that the position maintained in your 4th proposition on the different capacities of soils for receiving improvement appears to be tenable, that your reasoning seems to be sound and your conclusions just, I am not a little troubled with the conviction that the section of country in which I reside, cannot enjoy much of the benefit which will be derived from the information contained in your very useful Essay. And since I am so much troubled with the above conviction I should like to know of you with what effect clay ashes might be employed as a substitute for calcareous earth.

MISTAKES.

It is earnestly requested that all subscribers, after making payments, will examine the next printed list of receipts, and will immediately make known any omission or mistake that may be found. If this was done, with our course of procedure, there could not possibly be a mistake of two months duration. As it is, we are sometimes first apprised of them, when nearly two years have passed after the subscribers interested had the means of correction afforded them. Such occurrences are always unpleasant—and however promptly the few mistakes on our books have been rectified, when the proper information was offered, we have not always escaped giving offence, when entirely free, personally, from even the fault of neglect or carelessness. With every care to avoid such occurrences, we have not escaped making mistakes—nor can an entire exemption from them be expected under any circumstances. But our individual share of such errors is very small—and the means of speedy correction has always been offered in the list of published receipts.

But our subscribers make many more mistakes than all justly chargeable to us, or to former agents: and among them, there have been more overpayments offered, than all the overcharges caused by mistakes on our books. When second payments have been thus offered, the sums have been sometimes returned, and at others, entered to the subscribers' credit for a year later than they had stated. At other times, money has reached us for orders that could not be executed, and which were so carelessly expressed, that it was difficult to know where to return the sums. We now hold $10 thus sent three months ago, (from persons in Buckingham and Cumberland,) in a letter, without the writer's address, and concerning which we have written twice, and as yet in vain, and to different persons, to try to find out how to return the remittance.

TO CORRESPONDENTS AND READERS.

The advanced publication of one No. has served to bring forward all the mass of communications on hand, and we are now desirous of receiving, and ready to pay due and prompt attention to all others that may be soon sent in. So far as circumstances permit, we aim to publish communications as soon as possible after they are received and found suitable. None are held back to equalize the monthly publication of original matter: and therefore it may well happen, however abundant may be the supplies in general, that some Nos. may exhibit a deficiency. The first occurrence of that kind will be embraced to republish some old and long articles which well deserve to be made better known in this country, and which have been long ago selected with that view, but have been postponed for articles of present and more transient interest. Among these, are Strickland's Observations on the Agriculture, &c. of the United States, which it is believed has never been republished in this country, and has been seen only by a few of our farmers, in the bulky and very costly transactions of the British Board of Agriculture.

NOTICES TO SUBSCRIBERS.

Our subscribers at a distance, who are supplied through cross mail routes, have scarcely had the means of knowing, and therefore have not given due credit for the rare degree of punctuality with which this journal has been issued. During the whole time in which we have used the present publication office, the delivery of one monthly number only has been more than two days from the first day of any month—and then the delay of a few more days was made necessary by the editor's unavoidable absence, after the printing was completed. But delays, owing to various circumstances, sometimes occur after the packages are committed to the mail, and some of the post offices within 150 miles distance, may not receive their packages within two weeks after they have been mailed. Some causes of delay may be removed by changing one route from another—as sometimes the longest of two is the most speedy, or at least the most sure. Any information which can be furnished by postmasters or subscribers, pointing out proper changes of this kind, will be thankfully received. On the covers of this No. the day of mailing and departure will be stated, with the view of aiding such inquiries.

☞Subscribers are requested to read *at least once* the terms of publication. This request may appear superfluous and idle—but we often receive letters making inquiries, or professing ignorance of some of the plainest matters stated in the terms, and from old subscribers who have had them printed in more than a dozen of the copies which they have received.

NOTICE TO CONTRIBUTORS.

To each of the known contributors to the original matter of the Farmers' Register now on the subscription list, (not counting extracts of private correspondence,) a copy of the Supplement, containing the 2nd edition of the Essay on Calcareous Manures, has been presented, and sent by mail. Some persons have been necessarily passed over, for want of knowing their proper names or address—and probably others by mistake. It is requested that all such omissions may be made known, and they will be promptly supplied.

When stating in general terms, some months ago, the number of individuals who had written for the Farmers' Register, it was done without much regard to exactness, and only taking care not to state too large a number. Upon making a careful examination at the close of Vol. II, it was found that the prior statement was much below the truth, and that the actual number of contributors then was 215. The names of much the greater proportion of these still are subscribers to the Farmers' Register, and it is hoped that all will continue to add to their former favors—and in every successive publication there are presented the contributions of new and welcome aids. To all these friends we are indebted for the very existence of this work—and heavy as our obligation is admitted to be, still more of benefit has been conferred, by these contributions, on the agricultural community in general.

TERMS OF PUBLICATION FOR FARMERS' REGISTER.

1. The Farmers' Register is published in monthly numbers, of 64 large octavo pages each, and neatly covered, at $5 a year—payable in advance.

2. Or five *new* subscribers by sending their names and $20 at one time to the editor, will receive their copies for one year, for that sum, or at $4 for each. Purchasers of any 5 volumes (except Vol. I.) at one time in like manner, shall have them for $20.

3. The risk of loss of payments for subscriptions, which have been properly committed to the mail, or to the hands of a postmaster, is assumed by the editor.

4. For all copies not received by mail, duplicates will be furnished to those subscribers who have complied with their own obligations.

5. If a subscription is not directed to be discontinued before the first number of the next volume has been published, it will be taken as a continuance for another year. Subscriptions must commence with the beginning of some one volume, and will not be taken for less than a year's publication.

6. The mutual obligations of the publisher and subscriber, for the year, are fully incurred as soon as the first number of the volume is issued: and after that time, no discontinuance of a subscription will be permitted. Nor will a subscription be discontinued for any earlier notice, while any thing thereon remains due, unless at the option of the editor.

THE FARMERS' REGISTER.

Vol. III. AUGUST, 1835. No. 4.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

From the Genesee Farmer.

THE CULTIVATION OF WHEAT.

The following paper on the cultivation of wheat, was read before the Agricultural Society of this State at its meeting in February last, by H. Hickock, Esq. of Rensselaer county.

There are two causes which, when our winters are open, operate injuriously on wheat crops.—One is, the high and dry winds, which prevail in March; these blow off the soil in many situations, and by leaving the roots of wheat exposed, occasion their destruction. Another cause, is the heaving of the soil, occasioned by the alterations of cold and warm weather. The water in the soil, in the act of freezing, expands and raises up the earth, and also the roots of the wheat plants which the earth embraces when a thaw succeeds, the earth being heaviest, falls down first and leaves the roots of the wheat a little elevated, and by repeated changes of the weather, the roots are so far thrown out as to perish.

Farmers, when convenient, usually sow their winter grain early in September, upon a supposition which guides their common practice, that grain thus early sown withstands best the action of unfavorable seasons. This supposition, is founded upon the very plausible theory, that as the oldest roots will be longer and more numerous and take a firmer hold of the soil than those which are younger, they will be less exposed to be thrown above it, and at the same time, from their strength, be more tenacious of life. But experience informs us, that wheat, sown as late as the first or even the second week in October very often survives with less injury than that which is sown in the early part of September. Indeed farmers very generally admit, as the result of their experience, that rye, whose laws of vegetation must be nearly the same as those of wheat, sown so late in the season as barley to come up, is most likely to withstand an unfavorable winter. Still the very plausible theory, which has been mentioned, very generally induces them to sow rye early as well as wheat, in direct opposition to conclusions, which have been drawn from actual observation.

An experiment was made last autumn for the purpose of collecting some further information on this subject. On the first day of September last, I excavated a spot of ground six feet square. On the one side, the excavation was about six inches deep, on the opposite side, its depth did not exceed one inch. Seed wheat was placed over the bottom, so that the kernels were about four inches distant from each other, the excavation was then filled up. The soil was a suitable mixture of gravel, sand and clay, for wheat; and of ordinary fertility. This was the latter part of the extreme drought which prevailed last summer, and the soil was dry, warm and finely pulverized before it was thrown on the wheat. The circumstances, except the extreme dryness of the soil, were highly favorable to the vegetation of seed at the greatest depth in the earth. On the fourth of the month there was a heavy shower which not only wet the soil, but beat it down close and hard. On the ninth of the month, the plants began to show themselves; but none come up from a greater depth than about three and one-half inches. Two or three days after the second leaf had displayed itself, some of the roots were taken up and examined. It now appeared that nearly an inch below the surface of the ground, a new joint was found which was the basis of the second leaf, and also of a new system of roots. There were now two tiers of roots; the seed or knot adjoining it, had generated the lower tier, and the new joint the upper one. These two tiers or systems of roots were connected together by a root resembling a cord or thread, and in one instance, I cut off this connecting thread and transplanted the upper part. This grew with little apparent check from its curtailment; but the under part died, although the soil above it was opened so as to afford it the advantages of air and solar heat. On the 20th day of September, I examined another plant, which had its regular formations as expected, and, what was not expected, a blade was discovered about an inch long, which had started from the lower system of roots and would doubtless have found its way to the surface, had it not been disturbed. It is to be remarked, that this plant sprung from seed placed under cover of nearly four inches of soil, which was about an inch deeper than any of the other plants examined, and that some of the tops of the wheat plants had been eaten off and trodden down by accidental intrusion; a fact unregarded at the time. On the 26th day of September I examined another root, expecting to see the blade from below more perfectly developed, none however was discovered; but a third tier of roots was found at the surface of the ground, which proceeded from the second as that had from the first system of roots. On the 16th day of October I placed some seed wheat about two inches in the ground; their delay in coming up induced me to suppose that they had perished from cold and wetness; but at the expiration of three weeks they made their appearance, and although the ground remained open several weeks longer, no second leaf appeared, of course no joint or second system of roots had been formed. The very different formations in the roots of wheat, which this experiment has disclosed, proceeded from causes appropriate and capable of being ascertained, but to distinguish them with certainty, other trials must be made and conducted with greater accuracy than the one of which an account has been given.

From these experiments, though inaccurate, some conclusions may perhaps be drawn of practical use. All plants which live over winter, possess an apparatus, by which they supply themselves, in autumn, with food for their sustenance in spring. This food consists mostly of saccharine matter, which is enclosed in a proper receptacle. When this receptacle is formed near the surface of the earth, the fermentation of its contents is excited by frequent changes of weather, the saccharine matter is decomposed, and the plant perishes from the want of food, and perhaps also from a rupture of its vessels.

All wheat, shallow-sowed, must have its reservoirs of food but slightly covered with soil, and of course they are fully exposed. When wheat is sown early at any depth, a second, and sometimes a third system of roots is formed within an inch of the surface. In these, many stems originate, each of which has its receptacle of nourishment at its base, and it is quite certain that in most instances, the food, which was contained in the seed and the adjoining knot is entirely exhausted by the supplies of nourishment it affords the upper portions of the plant. The life of early sowed wheat must then, like that which is shallow sowed, depend upon the preservation of the reservoirs of saccharine matter which are placed at or near the surface of the ground, and of course exposed to the unfavorable action of variable weather during winter.

Wheat which is late sowed, generates no second blade or new system of roots, and of course, the nourishment for spring's use is retained in the receptacle which adjoins the seed. If then we sow sufficiently late in autumn, and place the seed deep in the soil, we shall provide every security against the hazards of bad weather, which the nature of the case admits of.

In the ordinary course of husbandry, some of the wheat is necessarily deposited at considerable depth in the soil, and when this takes place sufficiently late in the season, the receptacle of food will be protected by its covering of earth, and a partial crop will often be realized, although there may be, when the spring opens, no signs of life on the surface of the field. In such cases as the destruction of the blade, which issues from the seed-roots in autumn can be of little importance, one would suppose that the surviving plants will grow the more vigorously, from their being less in number, and by tillering produce many stems with large well filled ears; such, however is not the fact; usually the stems are single and the heads are not large. To account for this, it must be recollected, that after the ground has thawed in the spring, the earth settles and often becomes so extremely hard that doubtless many plants die, in their struggle to overcome the opposing resistance, and the surprise is, that any one should possess vigor enough to protrude even a single stem through the hard earth that covers it.

From this view of the subject, the practice may be recommended, of effectually harrowing the field in the spring after the ground has settled, in order to supply the plant with fresh air, and give a free passage to its upward growth. After the harrow has been used, the roller ought to be employed to reset such roots as have been displaced and diminish the evaporation of moisture.

In England, a wheat plant has been taken up, separated into eighteen parts and replanted, and by successive divisions and replantations, a crop of three and one-third pecks of wheat was obtained in less than eighteen months from the time the seed was sown. If the roots of wheat can be so minutely divided and successfully replanted, there is little danger that the freest use of the harrow can be injurious, provided the roller be also used. The fact appears to be, that nothing is necessary to theveral growth of the plant, but the preservation of the apparatus which contains the saccharine matter, which is its proper vernal food; so that if the roots and top be cut off, and the bulb be planted in a genial soil, the plant will grow.

Notwithstanding the arguments which have been urged in favor of sowing wheat late, it must be conceded that when early sown and our fields are cultivated in the usual manner, it produces the largest crop, if it survive the cold season. Whether such improvements may not be made as to combine the benefits of a sure and large crop, is a question still open to investigation; the probability is, that both advantages may be secured, by a more correct knowledge of the proper time to sow, and of the best methods of culture.

In the first volume of the transactions of the society for the promotion of agriculture, arts and manufactures, instituted in the state of New York, it is stated that in Huntington, Suffolk county, fifty-two bushels of wheat had been raised by manure on an acre of land, and Mr. Downs is said to have raised, on a poor, gravelly, dry soil, by the use of fish as a manure, at the rate of 128 bushels of rye per acre. In this case, the rye would doubtless have lodged and been of little value, were it not that it was twice eaten off by his neighbors' sheep which broke into the lot; once when the rye was 9 inches high, and again when it was about 6 inches high.

The production of so large a crop of wheat and of rye must have proceeded from causes which are steady and uniform in their operations, and if all the circumstances which had occurred to produce them had been distinguished and noted down, similar crops might have been again raised. Some things which occurred during the cultivation of this rye crop may be ascribed to accident or chance, so far as Mr. Down's sagacity was concerned, but the causes which proximately occasioned the crop, did not work by accident or by chance, but agreeably to the laws or rules from which they never deviate. This uniformity of operation lays the foundation for making future discoveries, and brings within the grasp of our faculties the knowledge of increasing our crops by methods the least laborious and expensive.

The period may arrive when the farmer shall pursue his methods of culture with an anticipation of the consequences which will result, analagous to that of the mechanician in the construction of a machine, and when, by direct means, he shall produce greater crops than ever were obtained by mere empirical trials.

Time was when the greatest philosophers taught the doctrine, that all things pertaining to the surface of the earth were too irregular and too much under the government of chance, to admit of scientific inquiry; this error has, within the two last centuries, been dispelled. But a similar error, in regard to rural affairs, is embraced by almost all our practical farmers, and the task of correcting and exposing it is devolved, it would seem, upon the unaided efforts of a few individuals. Here then is the difficulty.

From the Rochester (N. Y.) Daily Democrat.

UNPARALLELED SPEED UPON THE CANAL.

On Saturday, some forty or fifty of our citizens took a ride upon one of the new line packet boats, designed to run between this city and Buffalo. The boat is made considerably narrower than the ordinary packets; is exceedingly light, and finished in the most elegant manner. It is a sample of the workmanship of our enterprising and faithful fellow citizen, Seth C. Jones, who has for some time, we understand, been of opinion, that a boat might be so constructed as to be drawn by horse-power, at the rate of ten or twelve miles to the hour. The test on Saturday was a delightful realization of the fact. Although the horses were unaccustomed to the business, and for four or five miles of the distance, were exceedingly fractious and hard to manage; the ride was completed in two hours and thirty-four minutes, a distance of twenty-four miles, including changes of horses and a short stop at Spencer's Basin. It is found by experiments, that when the boat is propelled at the rate of seven and a half or eight miles to the hour, it rides upon the swell, creates less commotion in the canal, than the common packets at four miles to the hour, and requires, we believe, about the same power to draw it. An enterprising company has been formed to run a daily boat of this size to Buffalo, leaving Rochester after breakfast and going through by daylight, a distance of ninety-five miles! This will be "going ahead" on the "rail road principle," and those who are going from this to Buffalo, or from Buffalo here, we think it will not be difficult to say *how* they will go.

Extracts from an Address to the Essex County Agricultural Society.

ON IRRIGATION.

By Ebenezer Moseley, President of the Society, *September* 25, 1834.

The committee of the Essex Agricultural Society, on Irrigation, consisting of Daniel P. King, Hobart Clark and Moses Newell, report:—

That their attention was invited by Mr. Ebenezer Jenkins of Andover, to four acres of mowing land on which he has been making an experiment in irrigation. The field is a sandy gravel, the kind of soil most capable of improvement by watering, and so situated as to be flowed at pleasure. Mr. Jenkins bought of a neighbor the use of the water and the privilege of digging through his pasture for ten years, for twenty dollars; he then built a dam across a constant stream and made a channel about fifty rods in length; by means of this and other smaller ditches, he conducts the water on his field in such quantities and at such times as he thinks proper. Mr. Jenkins states that it is his practice to bring the water on the last of April, and to stop flowing about the 25th of June. In the spring of two years out of the four that his land has been in a course of experiments, he has applied a very light top dressing. The experiment has been successful and creditable to the enterprise of Mr. J: the average crop of grass for a number of seasons, according to the statement of several disinterested and judicious farmers, had not exceeded 10 cwt. to the acre: for three years past it was nearly equal to 30 cwt. and the present season, was judged to be two tons to the acre; the quality of the hay is good, and it would command a fair price in the market.

Irrigation, though long and extensively practised in other countries, has been but seldom attempted here. That it might be profitably employed by many farmers is probable: that it has been so employed by Mr. J. is certain. We will offer him a few suggestions; if the trial should not prove them to be improvements, he will have the additional merit of having extended his experiment, and having proved many things, he can hold fast to that which is good.

We think he should commence flowing earlier in the spring, and draw off the water sooner than the 25th of June; his grass would be ripe earlier, and by bringing on the water directly after the hay is housed, he would probably secure a heavy second crop. If his top dressing were applied in the fall instead of the spring, it would protect the grass in the winter, and might be productive of greater advantage. Mr. J. in his statement remarks that "observation and judgement are required to know how and when to apply the water," we agree with him, and offer our hints with some distrust of our ability to advise him. The writers on the subject whom we have consulted, recommend a course different from his in some respects. They say that the night, and cool or cloudy weather are to be preferred for bringing on the water. They also give a general rule, that no water should be applied, (unless in time of drought,) when the grass is tall and nearly full grown, as it might cause it to lodge, might make it gritty, or give it an unpleasant taste.

In our opinion Mr. Jenkin's experiments and statement are satisfactory, and entitle him to a premium of $20 00

Respectfully submitted by,

DANIEL P. KING.

New Rowley, Sept. 25th, 1834.

Ebenezer Jenkin's statement, to the Committee of the Essex Agricultural Society, on Irrigation.

Gentlemen—I present you with the following as a statement of my method of irrigating my mowing land. In the spring of 1831, I purchased of a neighbor for twenty dollars, the privilege of conducting the water from a constant brook, through his pasture, for the term of ten years: I then made a canal or ditch about fifty rods in length, after constructing a wooden dam across the brook; and on the 31st of April conducted the water on to one acre of sandy field land. This land has a gentle slope towards the south, had been four years in grass and the average crop was about one half ton. I stopped the flowing of the water, June 25th. The hay when made was estimated by judicious neighbors to be two tons.

In 1832, I continued and extended the experiment. On the acre above named, I obtained about two-thirds as much hay as last year. On the two acres, covered with water, for the first season, I obtained by estimation three tons of clover hay. Method of flowing the same as in 1831.

In 1833, I applied a light top dressing of compost manure, which I obtained by ploughing a yard where I had watered my cattle one winter. It amounted to about four cords, was mixed fine, thrown into a heap where it laid through one winter, and was spread in the spring. I obtained this year by estimation from 23 to 27 cwt. per acre.

In 1834, in the spring, I spread on about four acres eight cords of compost manure which I bought for $2 50 per cord. The water was used as in former years. The crop of hay has been estimated by several farmers at from 30 to 40 cwt. per acre.

It is not in my power to detail accurately the manner of using the water, as no two seasons are alike. Observation and judgement are required to know how and when to apply the water. I let the water on whenever we have a severe shower, for the benefit of the wash, which as you will perceive on viewing the land and brook, is great. I consider the water of greater benefit when the sun shines, than in cloudy weather at the same temperature, as the water draws the sun, and the warmer the water is, the faster the grass will grow. In the season of 1832 the frequent rains deceived me: on such sandy land we have seldom rain enough to supply the wants of the grass: in that year I think I did not bring on water enough. The actual expense of my experiment and the top dressing I have named, I estimate at $58.

Respectfully submitted by,

EBENEZER JENKIN'S.

Andover, Sept. 11th, 1834.

From Featherstonhaugh's Geological Report.

IMPORTANCE OF GEOLOGICAL PRINCIPLES TO MINING OPERATIONS.

It may also be instructive to observe here that the eastern coal field of the southern states, with which we are acquainted in Virginia and Alabama—in the former of which states it has already become a source of great wealth, giving constant employment to locomotive power and shipping—may reasonably be inferred, from some known partial indications, to be continuous between those points. I can confidently assert, from personal inspection, that there is a very promising line of continuity between those extreme points; and the bituminous coal, of a very fine quality, may reasonably be expected to be found in situations where it does not crop out on the surface. As an evidence of the confidence which may be placed in geological indications, I consider it important to mention, in a brief manner, a coal mining operation now conducting in England—and which had just been commenced during a visit I paid that country in 1826—upon the sole ground of an entire confidence placed in geological principles, and without any indication whatever of coal cropping out on the surface. A shaft was sunk at Monkwearmouth, near Sunderland, in the county of Durham through a group of calcareous rocks which were supposed, from the immutability which rocks are believed to preserve as to the order of superposition to each other, to overlie certain coal veins existing in the contiguous parts of the country. The shaft was sunk 344 feet beneath the surface before any coal was found; they then reached a small seam of one and a half inches in thickness. This occurred in 1831, after encountering incredible difficulties in stopping an influx of water that had frequently almost overpowered them. They proceeded to a depth of one thousand feet, when it became necessary to invest more capital in pumps of greater capacity, and this without meeting more coal. But the proprietors had confidence in their operations, and, amidst the loudly expressed doubts of many of their friends, persevered until, at a depth of 1,478 feet below the level of high water mark, they reached a very valuable seam of fine coal, and are actually now carrying their shaft to a depth of one thousand eight hundred feet, in order to reach a vein of coal long worked in other situations, and which they are confident will be found within that depth. This vein, when reached, will repay all the outlay of capital, and become a source of great wealth.

From a Dublin Paper.

IMPORTANT SCIENTIFIC DISCOVERY.—REFUSE OF COAL GAS.

The scientific researches of Messrs. Enderby have changed this useless, and indeed expensively encumbering material to the holders, (as they were prohibited from even throwing it away, under considerable penalties on account of its pernicious qualities in the river or its offensive ones in air) into a valuable commodity. The material by a simple process of purifying will be of most essential service where intense light is required. The light it gives is only to be surpassed in brilliancy where a stream of hydrogen and oxygen gas is in combustion upon lime, or phosphorous is burnt in oxygen. Such being the fact it will be found most valuable in the lighthouse, and save many a mariner from a watery grave. It is also equally applicable to street or factory lights. Its leading recommendations are these—first, its cost is about one-tenth of gas viz; a light equal to a large cockspur burner can be procured for eight hours, at an expense of three halfpence. Second no wick is required, the lamp requires nothing but replenishing the receiver. Third, it has no offensive smell while in a state of combustion. The lamp is made of tin or any other suitable metal and the material flows into a cup; a stream of air is admitted through the centre of the flame, and a double cone open at the apex is placed upon it and the light is regulated by a cock. In the absence of this arrangement, it will hardly keep in a state of ignition.

From the American Farmer.

SHEEP HUSBANDRY.

Ravensworth, March 25, 1834.

Dear Sir—I have thought it not impossible, that in the present depressed state of agriculture, the following estimate of the profits of a farm devoted exclusively to sheep, might be of service to some of your numerous readers. I am not, I think mistaken, in supposing, that at the price at which corn and wheat now sell, they cannot be advantageously cultivated on lands yielding less than fifteen bushels of the former, and eight bushels of the latter per acre. And yet how many thousand of acres, both in Virginia and Maryland, are either thus employed at an expense very far exceeding their production, or are abandoned as wholly unfit for any agricultural purpose whatever!

My own experience has satisfied me that lands of this description, even of the poorest quality, may (if broken and tolerably well watered,) be advantageously converted into sheep-walks; and by a judicious course of husbandry, be made not only to produce a fair interest on the capital invested, but to furnish within themselves ample resources for their own renovation. To point out the means of accomplishing this desirable change is the object of the following estimate.

Very respectfully, yours, &c.

WM. H. FITZHUGH.

J. S. SKINNER, ESQ.

Estimate for a Farm devoted exclusively to Sheep.

A farm, containing 1000 acres of land, under a good fence, having a dwelling house and all necessary out houses, together with two milch cows, two work horses, (or four oxen,) two breeding sows, one thousand sheep, a light wagon, cart, gear, ploughs, harrows, hoes, spades, axes, and all other necessary utensils, may very readily be purchased in convenient locations, either in Maryland or Virginia for $12,000; which if it yields only six per cent. on the purchase money, or $720 nett per annum, would be a more profitable and safe investment than can be made in any stock in the U. States. But it is susceptible of demonstration, that with tolerably judicious management, it may be made to yield nearly double that amount, and be itself annually improved in value.

The following is the system of management, which, after long experience, I have no hesitation in recommending.

The farm and every thing appertaining to it, except the sheep, being secured at the beginning of the year, the first operation should be to throw it into three divisions, viz: two fields for grazing, of 350 acres each, and one of 300 acres, comprising the woodland, garden, house lots, and about 100 acres of open land for cultivation and improvement. This arrangment and the necessary fences may be completed during the freezing and wet weather of January, February and March; while the dry and open weather of those months should be devoted to ploughing and harrowing about 40 acres of arable land; one-half of which may be sown in oats, for a crop, by the end of March, and the other half planted in corn between the 1st and 15th of April.

These operations being completed, there will be time enough before the corn requires cultivation, to plough, harrow, and sow down in oats, ten acres more of the arable land for the purpose of improvement, by folding the sheep and cattle in them during the summer and fall; after which, the chief occupation of the hands till harvest, will be the cultivation of the corn and attention to the sheep, which ought to be purchased and brought on the farm as early in May as possible, and together with the cattle be folded every night on the oat grounds prepared for them, in a pen containing about half an acre of land.

As this business of folding is to be the great source of improvement and profit on a sheep farm, it ought to be managed with the greatest care. No danger need be apprehended to the sheep either from dogs or disease, provided cattle be always folded in the same pen with them, and care be taken never to put them up till after sunset, and always to turn them out before sunrise. With a view to the rapid and permanent improvement of the soil, I consider the following the best possible mode of conducting this part of the system.

When the first fold is sufficiently manured, (which will be eight or ten days, the pen should be removed, the ground ploughed, harrowed, and sowed down in oats, and ruta baga turnips; and the same process be pursued with each succeeding fold, till the first of August; care being taken in the meantime to turn in all that portion of the land prepared for folding, on which the oats have ripened before the folds have reached them.

On the 1st of August, the sheep should be divided into two flocks—one containing the breeding ewes and stock weathers; the other consisting of the lambs and such old ewes and weathers as it may be desirable to prepare for market. At this time too, the folds should be brought back to the ground first penned and sowed in oats and turnips, which will now be covered with a fine growth, and be ready for a second penning. In performing this operation two pens must be employed for the two divisions of sheep; the lambs and the muttons being permitted to occupy each pen, in advance, about four days, and the main flock following for about the same time.

Lands thus prepared will be brought to the highest possible state of fertility. Such as are penned before the first of September, may be sowed down in turnips, for the use of the sheep during the winter and spring; and the subsequent penning of September, October, November and December may be put in rye, wheat, kale, Hanover turnips, or any thing that vegetates quickly, for spring grazing. A piece of the poorest land on my farm, treated in this way, (except that wheat as a crop, was substituted for turnips, oats, &c.) fattened me fifty of the best muttons I ever saw; yielded $22\frac{1}{2}$ bushels of wheat to the acre, and is at the end of three years, still covered with a fine coat of orchard grass.

We have now arrived at the period of the year in which the sheep are to be put into winter quarters. For this purpose, the fatted sheep ought to be sold off as soon as possible, the breeding ewes put to themselves in one of the grazing fields, and the rest of the flock in the other. Each parcel should be brought up at night into a small lot near the house, provided with uniform shelters, and there fed both night and morning, on hay, corn tops, blades, or turnips. As the ewes begin to yean, which ought to be in March, they should be separated, or permitted to run on the ground prepared for them during the preceding fall; and their condition will be very much improved at this time by feeding them night and morning with oats in the straw, cut up to a proper degree of fineness.

The operations of the next and every subsequent year, will differ from the first only in this, that instead of breaking up new ground for an oat crop, oats may always be put in the twenty acres of corn land and the ten acres of manured land of the preceeding year; and the last should always be sowed down at the same time in orchard grass and clover. Ten acres of highly improved grass land would thus be added every year to the resources of the farm, until at length its quantity would probably justify the introduction of a few choice brood mares, as another source of profit, on the farm.

When the hundred acres first reserved for cultivation, shall, by this process, be converted into grass land, a farther encroachment, to the extent of fifty acres, may be made on each of the grazing fields, the same course of husbandry be pursued on them as on the first division.

The only permanent laborers requisite for such a farm as this, would be a man, his wife, and a boy old enough to plough. In shearing time and harvest, it might be necessary, perhaps, to employ additional labor.

The above system is adapted to the poorest description of high and broken lands in our country, and may be applied to a farm of any size, from two hundred to some thousand acres. I have now five farms, stocked with from two to five hundred sheep each, undergoing this process; and after experience of many years, and even at the present low price of wool, I have no disposition to change my system.

The following I consider a fair estimate of the product, expenditure and profits, of a farm of 1000 acres, thus cultivated.

Product. To be used on the Farm.

20 acres of corn manured in the hill, at 3 barrels per acre,	60 bbls.
20 acres of unimproved land in oats, at 5 bushels per acre,	100 bush.
10 acres of manured land in oats, at 20 bushels per acre,	200 bush.
5 acres of turnips, at 200 bushels per acre,	1000 bush.
Hay, veal, hogs, &c. &c.	

For Sale.

The wool of 1000 sheep, estimated at 4 lbs. (in the dirt,) per head,	4000 lbs.
An increase of 400 head of sheep, after making allowance for casualties, the use of the farm, &c.	400 head.

Supposing every thing made on the farm, except the wool and the increase of the sheep, to be consumed, we shall have for sale—

4000 lbs. of wool in the dirt, at 25 cents per lb.—equal to,	$1000
400 lambs and muttons, at $1 50 per head,	600
Gross sales,	$1600

From which deduct—

For permanent and occasional labor,	$200	
For contingencies,	200	
		400
Nett profit,		$1200

Being ten per cent. on the original investment. I will only add that this amount might, of course, be very much increased, by improving the quality of the wool.

W. H. F.

From the Tennessee Farmer.

USE OF TOADS OR FROGS TO DESTROY BUGS IN GARDENS.

On every square rod planted with cucumbers, put a piece of a board flat on the ground, to preserve your plants from a striped bug, which some seasons is very destructive. This simple experiment may seem to be novel and ineffectual; but the secret of the matter is, the board forms a shelter for a toad, which hops from under the cover at night and destroys the bugs, and during the day time may be found by turning over the board. Should any one have doubts on the subject, he can easily try the experiment.

Extract from A Guide to a course of Lectures on Geology, delivered in the University of Pennsylvania.

DESCRIPTION OF THE PRINCIPAL ROCKS, AND STATEMENTS OF THEIR COMPONENT PARTS.

By H. D. Rogers, Professor of Geology and Mineralogy.

The whole number of simple minerals is between 300 and 400; of these, however, a very small list will be found to comprise the ordinary materials of most rocks.

The following table embraces those minerals which occur, mingled together, most frequently in nature. They are given nearly in the order of their relative abundance, with the average quantity of the several metallic oxides, earths, &c. which enter into the composition of each.

TABLE OF MINERALS, &c.

	Silica	Alumina	Potash	Soda	Magnesia	Lime	Ox. of Iron	Ox. of mang	Fluoric acid	Water	
Quartz	99.00								1.00		
Feldspar	64.04	18.94	13.66				0.74				
Mica	46.14	26.16	10.12				8.17	0.61	1.09	2.00	
Hornblende	45.69	12.18			18.79	13.83	7.32	0.22	1.50		
Augite	54.86	0.21			16.49	23.67	4.44	0.42			
Hypersthene	54.25	2.25			14.00	1.50	24.50			1.	
Serpentine	42.50	1.00			38.63	0.25	1.50	1.62		15.20	Chrome 1.25.
Diallage	47.20	3.70			24.40	13.10	7.40			3.20	
Schorl	36.03	35.82	0.71	1.96	4.44	0.28	13.71	1.62			Boracic acid 3.49.
Chlorite	27.43	17.90	1.56		14.56	0.50	30.63			6.92	
Talc	56.90	0.80			26.40	4.00	8.10			3.00	
Garnet	39.69	20.19				1.01	35.99	3.09			
Steatite	61.68	0.83			27.80	0.25	2.50			6.00	
Actynolite	50.00	0.75	0.50		19.75	9.75	11.00	0.50		5.00	
Green sand	50.00	7.00	10.00				21.00			11.00	

Carbonate of lime.—Lime 56.00, carbonic acid 44.00.

Carbonate of magnesia.—Magnesia 48.00, carbonic acid 49, water 3.00.

Sulphate of lime.—Lime 32.00, sulphuric acid 46.00, water 22.00.

Muriate of soda.—Soda 53.44, muriatic acid 46.55.

Oxide of iron.—Iron, oxygen.

Sulphuret of iron.—Iron 47.85, Sulphur 52.15.

Descriptions of the above Minerals.

Feldspar.—Its colors are various, but it possesses a peculiar lustre, and a foliated structure, which distinguish it easily from other minerals. Occurs massive, disseminated and crystallized. Its common crystallized form, a broad six-sided prism, with dihædral summits; an oblique four-sided prism; a six-sided prism, terminated by five unequal faces. Structure foliated; cleavage in two directions; lustre shining, often pearly; translucent or nearly opaque; cross fracture conchoidal; fragments rhomboidal. Scratches glass. Before the blowpipe, on charcoal, in a bright heat, it turns glassy, whitish, semi-transparent, and melts on the edges into a translucent, frothy enamel, with great difficulty. With borax, fuses slowly into a clear glass. With solution of cobalt, gains a blue color on the fused edges. Specific gravity 2.54. Abundant in the gneiss rock near Philadelphia.

Mica.—Characterized by the readiness with which it splits into extremely thin, smooth, shining plates or scales, which are transparent, flexible, and highly elastic. Occurs abundantly disseminated in grains or spangles, also in masses, and sometimes in regular six-sided tables. Colors various; lustre shining, often pseudo-metallic. It is scratched by the knife, but the edges scratch glass; smooth but not unctuous. Different micas differ in their behavior before the blowpipe; generally they are fusible into a gray enamel, but with difficulty. Specific gravity 2.7. Abundant in the mica slate a few miles up the Schuylkill, also in the rock at Fairmount; beautiful masses occur near Wilmington.

Hornblende.—Color dark bottle green, passing into black; occurs massive, also sometimes in six-sided prismatic crystals; fracture crystalline, showing fibres confusedly aggregated; opaque when black; translucent on the edges when green; lustre shining, pearly; powder or streak, green; exhales a bitter smell when moistened. Before the blowpipe, melts with great ease into a blackish colored glass. Specific gravity 3.15 to 3.38. Found on the Schuylkill, not far from Fairmount.

Augite.—Prevailing color dark green, sometimes blackish or yellowish green; also brownish, gray, or even white. Massive, crystallized, and in grains. When regular, in six or eight-sided prisms, terminated at each extremity by two faces. Structure foliated. Lustre glimmering or splendent. Before the blowpipe, melts into a black enamel, with extreme difficulty, and only in minute proportions; this property distinguishes it from hornblende, which it much resembles in appearance. Specific gravity 3.15 to 3.57. Found a few miles from Baltimore.

Hypersthene.—Dark greenish brown or black, with pseudo-metallic reflections of a copper red; massive; structure lamellar; opaque. Powder dark greenish gray; yields slightly to the knife; scratches glass. Before the blowpipe, on charcoal, fuses easily into a grayish green opaque glass. Melts easily with borax into a dark green glass. Specific gravity 3.4. Found on Brandywine creek, Delaware.

Serpentine.—Common serpentine is usually classed as a simple mineral, though the composition of the rock which receives this name is by no means definite and uniform. Colors green, yellowish green, blackish green, brown, bluish gray, or reddish, variegated with stripes, veins and blotches; generally opaque and dull. Massive; fracture uneven, or splintery; hardness extremely variable; often gives out the odor of clay when breathed on. Heated in a flask, it gives off water and turns black. On charcoal, turns white, and in a good heat, melts on the thin edges into an enamel. With borax, slowly melts into a clear green colored glass. Gives a red color when fused with solution of cobalt. Specific gravity, 2.5. Bare Hills, near Baltimore; Hoboken, New Jersey; West Chester and Montgomery county at Easton, Penn.

Diallage.—Of this mineral there are two species; the *metalloidal* is however, the commonest as an ingredient in rocks. It is sometimes called Schiller spar; its colors are bottle emerald or olive green, yellowish or pinchback brown. Lustre approaching to semi-metallic. In granular concretions. Lamellar. Opaque in mass, but transparent in leaves. When turned towards the light, the colors suddenly appear and disappear, as in Labrador felspar. In the flask or matrass, yields water, crackles, and acquires a clearer color. Before the blowpipe, on charcoal, melts slowly on the edges into a gray scoria. With borax, melts with much difficulty into a transparent glass, somewhat tinged. Some variety infusible before the blowpipe. Specific gravity 3.1. Commonly found in serpentine. Found near Haverstraw Bay, New York.

Schorl.—Color velvet or brownish black. Massive and crystallized in three, six or nine-sided prisms, variously bevelled and striated. Lustre glistening, vitreous; brittle; fracture conchoidal; becomes elastic when heated. Before the blowpipe, fuses by itself into a frothy mass, and turns white; afterwards melts with difficulty into a translucent grayish yellow bead. With borax, melts readily with effervescence, into a nearly colorless and transparent glass. Specific gravity 3. Schorl resembles hornblende, but has a vitreous lustre, a conchoidal or uneven fracture and is electric while hornblende has a shining, rather pearly lustre, is softer, has a splintery fracture, a lamillated structure, and is non electric. Found near Baltimore, Rhinebeck, N. Y. In the gneiss rock near Philadelphia, at Judge Peters' quarry above the upper bridge—fine specimens 8 miles on the West Chester road.

Chlorite.—Green is the prevailing color, varying from dark green to light grayish green, and generally dull; massive, crystallized, in minute hexagonal scales and earthy. Opaque, lustre, shining, pearly, soft, unctious; of a darker green than talc or epidote. Before the blowpipe on charcoal it melts into a black globule, with a dull surface; with boron forms a dark green glass, does not fuse or froth with soda. Specific gravity, 2.6 to 2.9.

Chlorite Slate has nearly the same color, with a slaty or foliated structure, composed of minute scales, less unctuous than talc slate, and more unctuous than mica slate. Harper's Ferry; Charleston, near Boston; near the Falls of the Schuylkill, in hornblende rock, with quartz at Willow Grove, and laminated near the soap-stone quarry, east side of the Schuylkill.

Talc.—Colors, various shades of green or greenish white, and silvery white, massive in thin plates or scales, easily separated; also indurated, and in hexagonal plates; flexible, but not elastic; lustre shining, pearly; soft, easily cut; very unctuous, gives a pearly white streak when rubbed on paper. Before the blowpipe, talc generally turns white, but does not fuse, the laminæ separate; with borax it melts with effervescence into a greenish transparent glass. Mica is flexible and elastic; talc is flexible, but not elastic. Specific gravity, 2.8. On the Schuylkill about ten miles from Philadelphia, in the soap-stone quarries, with rhombic spar, also near Baltimore.

Steatite, sometimes confounded with soap-stone, but improperly. Colors, various dull shades of green pale gray, yellow and red; gray is the most common, translucent on the edges, massive forming large beds; fracture ragged or uneven, with marks of confused crystallization, translucent on the edges; unctuous, can be cut with a knife, very soft when first taken from the quarry, yields to the nail. Before the blowpipe, hardens and turns black, but it is not fusible. Specific gravity, 2.7 to 2.5.

Soap-stone much resembles steatite; is much softer, being some times kneaded like dough when first quarried; it also fuses into a white and somewhat translucent enamel. On the Schuylkill, ten miles above Philiadelphia, connected with talc—extensively quarried under the name of soap-stone; also abundant in Connecticut, at Somers.

Garnet occurs in granular masses, and in roundish crystals, with 12, 24 or 36 sides; color reddish or blackish brown, opaque or semi-transparent; lustre glistening; brittle; fracture uneven; before the blowpipe, fuses with some difficulty into a blackish or greenish globule; with borax forms a glass colored green by the iron present; froths strongly when fused. Specific gravity, 3.69 to 3.76. At Haddam, Con. on the east side of Wissahickon creek, also 1½ miles above the falls of Schuylkill, in mica slate.

Actynolite.—Colors, green, sometimes deep and beautiful; also dark green and brownish. Occurs in wedge-shaped concretions and four-sided flattened prisms, often deeply striated, brittle, fracture fibrous; singularly harsh to the touch; lustre highly shining, silky; translucent; scratches glass. On the first application of heat it turns deep brown, afterwards melts into a greenish gray glass. Its color will distinguish it from hornblende, which it much resembles in form. Epidote is of a lighter or more yellowish green. Near Baltimore, in all its varieties; at Concord in Pennsylvania, in large masses; on the Wissahickon, ten miles from Philadelphia, in green needle-shaped crystals, in steatite.

Carbonate of Lime.—The forms and external appearance of this mineral, are extremely various. Its prevailing color, however, is white, or grayish white; it occurs compact, massive, granular, crystalline; its fragments are generally rhomboidal; cleaves readily by the knife in the direction of the natural joints, forming rhombs, with smooth polished faces, transparent or translucent; cross fracture uneven, but difficult to be obtained, from the ease with which it divides at the natural joints, scratched by the knife. Heated alone in the flask or matrass, yields no moisture. Before the blowpipe, on charcoal, infuses, if ture; does not tinge the flame, but glows with peculiar brightness when the carbonic acid has been driven off. Loses by complete calcination about 43 per cent.—becomes caustic, heats with water, and acts as an alkali. Effervesces when dropped in acids. Specific gravity 2.7. Its localities are extremely numerous. Some beautiful varieties are found at Lockport, New York.

Carbonate of Magnesia.—The crystallized variety is white, in delicate needle-shaped crystals, diverging and having the lustre of satin. The compact variety is gray or yellowish; either irregular or sponge-shaped; a splintery or a flat conchoidal fracture nearly opaque; yields to the nail; adheres to the tongue; dissolves slowly in sulphuric acid with effervescence. Before the blowpipe, infusible, but hardens so as to scratch glass—it then acts on moistened turmeric paper, like an alkali. Specific gravity 2.7. Occurs frequently combined with carbonate of lime. Bare Hills, near Baltimore.

Sulphate of Lime.—Gypsum, occurs massive, crystallized, granular, fibrous and compact; prevailing color white; sometimes gray, yellowish and reddish. Crystals flat, or six or eight-sided prisms, but oblique terminations; cleave easily into laminæ, which are flexible but not elastic; lustre shining, pearly; very soft; yields to the nail; frequently colorless and highly transparent. In the matrass, alone, gives off water, and becomes milky white, if pure. Melts into an enamel. On charcoal decomposes in the inner flame, after which it acts like an alkali. With borax, effervesces, and melts into a clear glass of a brownish yellow color when cold. Specific gravity 2.3. Nova Scotia, Niagara and west of New York; found also in the Jersey marl.

Muriate of Soda.—Common table salt is too well known to require description. As native rock salt, it occurs in great quantities beyond the Rocky Mountains, and exists in a state of solution in inexhaustible quantities in the formations of the western states.

Green Sand.—Color, various shades of green, from pretty bright grass green to deep olive green, and almost to greenish black: it has sometimes a dull greenish blue shade. Occurs in loose grains, about the coarseness of gunpowder, which the darker kinds much resemble. When very moist, can be kneaded between the fingers. Between the teeth has the sensation and taste of clay. Found sometimes alone in extensive beds, at others mingled in the loose slate with ordinary sand and mica; is disseminated through the substance of various limestone and sandstone rocks. It constitutes the green marl of New Jersey, and is found extending from that state, south through a great range of country, and far west upon the Missouri.

Oxide of Iron.—The various iron ores are generally too well known to require description here.

Sulphuret of Iron.—Color, brass yellow, passing into steel gray. Occurs in many regular crystalline forms, but more usually in that of the cube also irregular, brittle: fracture granular; lustre metallic, brilliant; too hard to yield to the knife, which distinguishes it from sulphuret of copper, which yields readily to the knife. Heated in the fire or in an open tube, it exhales the smell of sulphur. Is often mistaken by the ignorant for gold, but its great hardness immediately distinguishes the two. Specific gravity 4.7.

From Communications to the Board of Agriculture.

OBSERVATIONS ON THE UNITED STATES OF AMERICA.

By William Strickland, Esq. of Yorkshire. Received 8th March, 1796.

Mr. Strickland, having been favored with some queries from the Board of Agriculture, before his late visit to the United States of America, in which were pointed out objects of inquiry, connected with the institution of the Board, and particularly deserving his attention, takes the liberty of returning the following answers to them. He is satisfied that they are by no means complete, nor as worthy of the inspection of the Board as he could have wished them to have been; he hopes, however, that the imperfections will prove to arise rather from having omitted much, than from having stated that which is inaccurate; and that it will be considered, that his residence in that country was short, the country very extensive, and that other objects demanding his chief attention, might be very numerous.

York, Feb. 27th, 1796.

"What is the price of land?"

In taking an agricultural survey of the United States of America, our inquiries are rendered more easy in one instance, than they would be, in that of any other country, from the circumstance of one superficial measure only, being there made use of, the statute acre of England. As far as I could find, no other measure is known or referred to; but in other instances, the result will prove very different; in Europe, and in England particularly, mere locality occasionally excepted, the quality of the soil has the chief influence on the price, and will in every country effect it, in proportion as agriculture is well understood. In Europe, the produce of the land is the object of the purchaser, or the rent, which to the owner, is the same thing; in America, quality of soil has little influence on the price; for there, agricultural knowledge in general is at the lowest ebb; for unless the land be actually incapable of producing any thing from being mountain or swamp, the quality of it is little considered in the purchase. This circumstance I should have been apt to have attributed to the great variety of produce cultivated in the country, in consequence of which every variety of land would be applicable to some of them, had I not observed the same uniformity of price, where the kind of articles cultivated was much more limited. In America, the price of the land is chiefly affected by the vicinity of easy conveyance of the produce, or of the great towns on the Atlantic, the chief seats of consumption and export; but the situation of it on navigable waters has always a greater tendency to increase the price, than distance from the coast has to depress it.

One other very essential difference is also to be pointed out; in Europe, rent must ever be connected with price, and that is influenced by the quality of soil; in America, rent is never thought of, for land is very rarely let; what instances of it have occurred, and what information I could procure respecting it, I shall hereafter state; but first, I shall proceed to the price; and with that view commence with Massachusetts, Rhode Island, and Connecticut. These states, being in so many instances circumstanced alike, having no *backlands*, as called, that is, lands lately taken up or settled; being all situated on the sea; all of the same early foundation: covered with an uniform and abundant population; inhabited by the same unmixed race; governed by the same laws, principles, and customs; actuated by the same spirit of order, industry, economy, and enterprize, may properly be taken together, under the general name of

NEW ENGLAND.

This is universally an hilly country, of irregular surface, very rocky, in most parts great masses of stone lying on the surface, or starting abruptly from it, but no where what may be termed mountainous; the green-woods, [green-mountains] as they are called, running along the western extremity of it, and which are part of that chain of mountains which traverse the continent of North America, in the north-east and south-west directions, are here of no very great height, and would, I believe, admit of cultivation in almost every part of them; certainly where I crossed them in the north-west part of Massachusetts, where they by no means come under the description of mountains. The soil of New England has in general a tendency to clay, variously mixed with sand and loam, but nothing of a calcareous quality is known in any part of it.

The country is chiefly applied to the breeding and grazing of cattle and sheep; for which, from the verdure, and great inclination to produce herbage, it appears to be particularly calculated. No great quantity of grain is grown; I believe not sufficient for the maintenance of the people; so that in general the consumption demands import, certainly never admits of export.

All along the coast of New England, as far north as Boston, land sells on an average by the farm at from £3* to £3 15s. per acre, and is eagerly sought after at that price; much of this land is not of a good quality, and all of it greatly exposed to the influence of the sea. About Boston the price is considerably higher, particularly if near the town; a gentleman residing there, has an estate within three miles, consisting of three hundred and eighty acres, divided into two farms, which he has great difficulty in letting, and then only for £52 10s. per annum of which he does not receive more than £30, the rest being laid out in improvements and cultivation; besides which, he partly stocks the farms, having twenty cows upon them, his property. Supposing the land to be worth £3 15s. per acre, this estate,

* I have throughout reduced the various denominations of money met with in the United States, and the various currencies of the different states, to sterling; in larger sums, omitting minute fractions, but inserting them where their relative proportion to the sum could be of any material value.

cows included, does not net more than two per cent.

No person here will rent land.

About Dudley, land sells at £6 per acre, and upwards.

About Hartford, it will not produce more than three and a half per cent., and it is difficult to let it at that rate. A gentleman there, eight years since, gave £4 10s. per acre for some wood land and has since been offered £9 per acre for the wood only; timber and wood having doubled in price, in every part of New England, within ten years.

Very good land about the town of Springfield, will let, so as to produce five per cent. About Northampton, land, on the banks of the Connecticut, of most excellent quality, fit for every purpose of pasturage or cultivation, would sell for £5 5s. or £6 per acre; in favorable years this land would produce as high as twenty bushels of wheat, per acre, but more commonly produces fifteen or sixteen. About Chesterfield, land will sell according to situation, from £2 5s. to £4 10s. per acre. Here I saw a farm of one hundred and eighty acres, which three years since cost £135 in a very rocky, steep, and wet situation, but very abundant in grass.

Here, therefore, the average price is £4 per acre, and pretty uniformly declines as it is situated more inland, except in the instance of the range along the coast, the price of which may probably be lessened by its exposure to the sea; and the land appears to pay about three and a half per cent. interest.

NEW YORK.

This being the state in which the greatest land speculations take place, and to which the emigrants from Europe, who have any property, chiefly turn their attention, which from climate, the cheapness and plenty of land, the convenience of transport, the nature of the government, and laws and manners of the people, seems to hold out the most favorable circumstances for settlement, it will require to be particularly examined. In the immense range of country in the west part of this state, land may be got on very low terms; much of it is yet barely known, and much of it is either yet *unlocated*, or if *located*, only by those land jobbers who have purchased from the government of the state, vast tracts at very low prices, with a view to sell them again as soon as population should approach their districts.

The lower part of this state much resembles the country last described, being rocky and uneven, but in most places admitting of cultivation. About fifty miles from the coast, the country is traversed by the before mentioned range of hills, called, properly enough, the Highlands of New York; they are of considerable but unascertained height, probably about one thousand, or one thousand two hundred feet, and in many parts are entirely covered with woods, and apparently never will admit of cultivation, and may extend in breadth about fifty miles; beyond them is a fertile, beautiful, irregular country, extending to Albany, and thence back many miles to the country now only beginning to be settled. The soil much resembles that of New England, and has nothing of a calcareous quality known in it. This is the granary of North America; and a great quantity of wheat is now brought to Albany, from at least an hundred miles beyond it, grown on the banks and branches of the river Mohawk.

From the state of New York, many parts of the continent are supplied with grain; and from the city of New York, and the ports on the river Hudson, more grain and flour are exported, than from any other port in the union, except perhaps Philadelphia. Here also grain is cheaper on an average than elsewhere, according to the present price, by at least sixpence per bushel.

Fields within two miles of New York will let for from £2 14s. to £3 7s. 6d. per acre, to gardeners, &c.; in some instances I am told at still higher prices. An estate within and joining to New York, bought five years since for £1575, was sold in the summer of 1794 for £7312 10s. and was (in September, 1794) again selling in lots for building upon, and the purchaser expected to clear a very large sum. Another estate near New York, confiscated during the war, was purchased about seventy years since for £956 and sold lately for £112,500.

Phillips's Manor, which was likewise confiscated, was sold by the state for various prices, from 11s. 3d. to £5 12s. 6d. per acre; no average for the whole can be drawn, some of it being incapable of cultivation. Near Mount Pleasant, £393 15s. was asked for ninety-six acres, of which thirty were wood, with a good new house upon it worth £56 5s. or per acre £3 10s. Near Peckskill, a farm of four hundred and forty acres, one hundred of which were cleared land on a stream in a valley, the rest wood on mountains, not much of which was capable of cultivation, but in the woods sixty head of cattle might be maintained, would let for £14 per annum, and the price asked for it was £393 15s. or per acre 17s. 10d.

A farm near Kings Ferry, of two hundred and forty acres highly cultivated, well planted with fruit trees, in their prime, a good house upon it, with every thing in good condition, lately sold for £3375 or per acre £14 2s.; but then a convenient situation for trade added greatly to the price.

At Fishkill, a farm of one hundred and forty acres cost £223 15s. or per acre £2 6s. 3d. Close to the town of Poughkepsie, land sold at £28 2s. 6d. per acre, in small quantities.

Near Clermont, an English gentleman purchased five hundred acres for £2812 with a good house upon it, which was reckoned in the purchase at £562 10s. every thing in excellent condition, one hundred and fifty acres of it containing very fine timber, and the whole lying on the Hudson, or per acre £4 11s. This was reckoned a good purchase.

At Stephen-town, about twenty miles from Albany, and as many from water carriage, land sells at from £2 5s. to £2 16s. per acre. A gentleman in Albany bought a farm near that place, in 1789, for £22 10s. which he has since sold for £393 15s. and supposes it now worth double that sum.

Many tracts in all this country to the westward, bought within these few years, have since been sold for ten-fold profit; and in small tracts for much more.

An estate of one thousand acres, two hundred and fifty of which are best *river side* land, the rest pine land, but level and capable of cultivation, and some already cultivated on the Mohawk, opposite Schenectady, beautifully situated, with an house upon it, estimated in the purchase at £562 10s. is to be sold for £5625; or per acre about £5.

An extensive patent of excellent land, on the Mohawk, belonging to an English nobleman, was lately sold for less than 4s. 6d. per acre; while ten thousand acres very near it, through which the river ran, and which was sold four years since for 7s. 10½d. per acre, was at the same time again upon sale, and the price asked for it £1 2s. 6d. Many men of family and fortune in England possess large tracts in this state, and the land speculators of the country are particularly eager of dealing with them.

A gentleman gave, in 1791, £22 10s. for six hundred acres of soldiers' grants, and sold them, in 1794, for £331 10s. or 11s. per acre. A few years after the peace, he gave £16 17s. 6d. for one thousand acres in Jellisfonda, which he sold in November, 1794, for £393 15s. or per acre 7s. 10d.

Land at Konondaigua, on Seneka lake, which in 1789 would scarcely sell for 5d. per acre, two years afterwards sold for 2s. 9d.; four years after for 6s. 2d.; and I saw some of it sold in 1794, by public auction, in tracts of three hundred acres and upwards, for 8s.

A gentleman bought a tract of land in 1792, at Konondaigua for 2s. 3d. per acre, which in November, 1794, he sold for 9s. to one who purchased it to sell again.

A gentleman of rank in England, about the year 1790, purchased one million of acres on lake Ontario, in what is called the Chenesse country, for about 1s. 10d. per acre, which would in November, 1794, fetch from 4s. 6d. to 5s. 6d. when sold in large tracts of one thousand acres or upwards, and about 13s. 6d. when sold to settlers in smaller parcels, who have ten years credit; paying interest at the rate of seven per cent. during part of the time, or who purchase on some such terms, according to agreement.

A person of Hudson, had a large tract on the west of Lake Seneka, which he bought of the state in 1787, at 7½d. per acre, and which, December, 1794, sold for 6s. 9d. to a speculator to sell again. This land lies the farthest west of any I have yet heard of, being sold in this state; beyond it, the country is scarce known.

A person residing in Upper Canada, has a *township* of land consisting of one hundred and thirty thousand acres, at the junction of the Oswegatchi and the St. Lawrence, for which he was offered in January, 1794, 7½d. per acre, having put it up to sale at New York, to see whether it was at that time of any value; but many people having removed into that country, in the course of the summer, he was offered, in December, 1794, 4s. 6d. per acre for it.

Hence the average price of land, in the old settled country below Schenectady, (rejecting such as being mountainous is little capable of cultivation, and such as for mercantile purposes, or from being in the vicinity of large towns, is of increased value) appears to be £3 7s. 10d. per acre, and of the new settled country to the west of it, 9s. 3¾d.

So little land is rented in this state, except in the vicinity of towns, that there are no grounds on which to state the interest paid by purchases; I suspect, however, that it no where exceeds three and a half per cent.; but considerable tracts of land in the old Dutch patents, are what is here called, but improperly, rented; being granted out on leases for three lives, renewable on certain immutable terms, or on very long leases, or leases for ever, with a certain reserved rent usually in wheat, as from fifteen to twenty bushels per hundred acres, with various feudal services and payments annexed, of varying and uncertain value; but these do not afford sufficient data, on which to calculate the rent or interest. Proprietors of lands in this state are still in the habits of granting them out on similar terms.

NEW JERSEY AND PENNSYLVANIA

May very properly be taken together, the former appearing, as it were, part of the latter, extending eastward towards the sea; great part of it is a low, flat, sandy, wet unhealthy country, little frequented, and less cultivated. Inland of this tract in Jersey and Pennsylvania, is a dry, rising, irregular country consisting chiefly of what is here called isinglass land, a sandy soil full of micaceous particles, glimmer, and talc; from which the surface of the country, while the sun is shining, acquires a singular appearance; most of the remainder is a deep red loam approaching to clay, and which probably would have most of the properties of it, in a climate where there was more wet and less sun, is of great fertility, and capable, by proper cultivation, of producing every thing of which the climate will admit.

This country continues, with considerable variations in parts, to the chain of mountains which traverse the two states. These mountains are chiefly composed of micaceous granite, in some places on a limestone or marble base; they run in parallel ribs of great height,* and are in general very barren, and covered in many parts with shrubs and trees of humble growth, but divided by extensive and fruitful vallies, and may extend in breadth about sixty or eighty miles. Beyond them to the west is a vast tract of country, said to be fertile and fine, but not much known; and though the whole of it may perhaps be held under patents from the state, it is hitherto very thinly inhabited, and the greatest part of it not at all. Lots in the town of Paterston in Jersey, of one-fourth of an acre, sell for £15.

Near Brunswick, an English gentleman gave, in the summer of 1795, £2100 for three hundred and thirty-four acres of excellent land, fit for every purpose of cultivation, or per acre £6 5s. This being also in an eligible situation in every respect, was thought a reasonable purchase. A gentleman has two thousand five hundred acres in Jersey, which he lets, though with some difficulty, since so few choose to rent land, in seven farms, at a rent which he thinks pays better than at £4

* The highest ridge of these mountains in New Jersey, near the banks of the river Hudson, has lately been ascertained to be about 3,500 feet in height, above the level of the tide in the river at their foot. (*Transactions of the Society of Agriculture of New York, Vol. I. Part, II. p. 139.*)

per cent. but from this some deductions are to be made. Building lots in the principal streets in Philadelphia, sell at £60 per foot in front, and are from one hundred to one hundred and eighty feet in depth; before I left Philadelphia, I heard of one being sold for £72 per foot in front.

Land upon the Delaware, and the navigable waters that run into it, sell in each state for from £4 16s. to £5 12s. 6d. At two or three miles from water-carriage, at £2 14s. to £3 3s. These last prices I have found to hold through the greatest part of the old settled tracts of Jersey and Pennsylvania, but something lower as the situations are less convenient.

About York, among the Germans, land sells as high as £15 to £18 per acre; in the neighborhood of Lancaster, from £12 to £15; near the town, for £18. I saw a considerable farm, one mile and a half distant from it, that had just then been purchased at the last price; water-meadow land will sell there for £21 per acre; the industry and parsimony of these people having raised the value of land in their neighborhood at least two hundred per cent.

The best land in Jersey, and in that part of Pennsylvania which is east of the mountains, exclusive of the German tract, may be settled at about £4 per acre: they certainly average something more than the old part of New York, this tract not being mixed with any barren mountains, and being less rocky and broken.

The back-lands of Pennsylvania sell for considerably less than those of New York: from what information I could obtain, I could not state them at more than 3s. or 4s. per acre; a great quantity was upon sale for less; the tenure of them is less satisfactory than of those of New York, the titles less to be relied upon, and the whole having less credit, many egregious frauds having been committed upon purchasers, particularly those in Europe.

Very little land is let, few of the people born in the country being ever willing to become tenants, and farmers from England, who alone would be tenants of any value, are very few in number, and those, as far as I can find, in general not of a very respectable description. Custom or ignorance can alone cause this objection; since they who purchase land purchase it with money that would otherwise afford them seven or eight per cent. at the least; whereas if they rented land, it would be at a rate that would not pay more to the owners of it, than an interest of three or four per cent.; a great gain this to the tenant, who would besides have many indulgencies. So great is the difficulty of procuring regular tenants, that people here, who possess more land than they choose to occupy, or can cultivate themselves, are getting much into the way of letting it upon shares; a system which nothing but extreme poverty, or extreme ignorance, can vindicate.

This evil is rapidly increasing; an instance of this tenure I have before noticed at Boston. I have not yet heard of any in New York; but in Jersey and Pennsylvania instances are too frequent; to the south of these states I have met with none.

A country thus occupied must ever be in the worst cultivation, and both owner and occupier in a state of poverty. The terms of this tenure are various, according as agreements can be made; in some instances, the owner finds half the seed, and half the live stock, the tenant every thing else; and he has half the produce; in other instances, the owners find half the live stock, and have one-third of the produce, &c.

Want of capital in tenants, the difficulty of procuring them, and their ignorance when procured, was the cause assigned for this wretched mode of occupation; but it was observed, that under this tenure, the owner could command the mode of cultivation; and that therefore, such lands were better cultivated than others: this, however, presumes the landlord to be more intelligent than his tenant. The extent of the evils arising from this mode of occupancy, many parts of Europe sufficiently show: wherever it is found, poverty, and the worst of cultivation attend it, as ever must be the case, where the interest of the owner and the occupier are at eternal variance; here, the owner purchases the worst of stock, because it is the cheapest, and another is to have the management of it; and the occupier bestows the least labor, because another is to have half the profit of it. It was scarcely to have been expected, that such a system should have crossed the Atlantic.

DELAWARE AND MARYLAND

May with propriety be joined together. The former is of small extent, and occupies only one-half of that peninsula which lies between the two great æstuaries of Delaware and Chesapeake, each side of which peninsula much resembles the other. The whole of Delaware, and the adjoining part of Maryland, is a low country, apparently the creation of waters. It has in general a tendency to sand, is not much elevated above the sea, is fertile upon the coast, but swampy and barren within land. That part of Maryland that lies upon the opposite side of the Chesapeake, is in general sandy and gravelly; in places elevated into hills generally barren; and much worn out with the cultivation of tobacco.

The farther it proceeds west, till it arrives at the mountains, the more fertile it becomes, is less sandy, and at last, about Frederick, changes to that rich, red, friable loam, before noticed in the last states, here generally lying upon a steatite or soap-rock, which in many places rises to the surface. These two states are the first in proceeding towards the south, in which negroes abound, and in which the evils of slavery first appear, though here laying no very heavy burden upon those who are doomed to bear it; and here, slavery is rapidly giving way to emancipation. This state has no *back-lands*, and no territory of any great value west of the mountains, as in that part the Potomac, its southern boundary, and the Pennsylvania line its northern, contract within a very narrow space.

As the metropolis of the American Union is now building in this state, and is to become the seat of government in the first year of the next century, a very considerable rise in the price of land, and some improvement in the cultivation, will probably soon take place.

About Dover, in Delaware, land sells for £3 12s. per acre. About Buck's tavern, £3 18s. One thousand seven hundred acres, a few miles below Wilmington, were lately sold at £4 per acre. An English gentleman lately bought some on the Delaware, at £7 4s. but it was supposed with mercantile views. A person has two hundred and fifty acres of excellent land near Middletown, for which he has been offered £6 per acre: he lets them for £90 per annum, and binds the tenant to cultivation, or per acre 7s. 2d.; they pay an interest of £5 19s. 5d. per cent. On Wye river, in Maryland, a gentleman has several thousand acres, that produce him from £18 to £24 per hundred acres, chiefly paid in wheat, or per acre 3s. 7d. to 4s. 9½d. As such land would sell on an average of £6 12s. per acre, it pays an interest of from £2 14s. 3½d. to £3 12s. 7d. £7 14s. per acre was lately offered for half an island in the Chesapeake, called Chew's Island, which contains above two thousand acres, and refused. On Bohemia river, average price of land is £4 16s. some as high as £7 10.; if good wood land, which is much sought after, for at least £9. About Perry Hall, the general average of the country is £3 6s. Three or four miles from Baltimore, land will sell for, from £15 to £18 per acre; and small lots, near the town, from £36 to £42.

Old worn out land, without timber, on the Patapsco, thirty miles from Baltimore, has lately been sold at 9s. per acre. A gentleman has land at the back of the new city of Washington, which forty-five years since, cost £25 per hundred acres, for which he has lately refused £30 per acre. About the upper falls of the Potomac, land, equal part of wood and clear, will sell for about £3 12s. per acre. Land on each side of the Monocacy, will fetch from £3 to £4 4s. per acre; a mile or two from Frederick, ten guineas; close to the town, £18.

From the above, and many other notes taken in the state, it appears, that land here, excluding as I have before done, whatever is of increased value from mercantile situations, or the vicinity of large towns, sells at £4 17s. per acre: a price considerably higher than is to be met with in any other state in the union; more land also is let, and the interest paid by it, is higher; the causes of which I shall hereafter assign, when the prices are recapitulated and collected. The result of various notes, proves the rent to be about 5s. per acre, and the interest paid by land, about four per cent.

VIRGINIA.

This immense country possesses every variety of soil and surface; below the falls of the rivers, that is, for the space of the tide-waters, which may extend from the coast about one hundred and twenty miles, the country is very flat, apparently of late ages risen out of the sea, in many parts abounding with extensive swamps. The soil is in general a fine white sand, except on the banks of the rivers, not fertile, and much of the natural produce is cedars and pines, always indications of a poor soil. The country in general is very unhealthy, infested with fever and ague, and bilious complaints, as may be expected from such a surface, in such a climate; and is much worn out, having been long settled, and the chief produce tobacco. Above this, is an irregular waving country, lying for the most part in ridges, gradually falling down to the nearest rivers on each side, and high in proportion to their distance: this tract, which may extend about eighty miles inland from the head of the tide, in its original state, has not been fertile except on the banks of the waters.

Beyond this to the foot of the *Blue Ridge*, across, and comprehending what are called the South-West Mountains, but which are only a range of hills, a step to the Blue Ridge, capable of cultivation in almost every part, is a tract of the same red land before noticed, as lying to the east of the mountains: it is here of its deepest red; deep as red ochre or chalk, and with its intensity of color, has acquired its utmost fertility. A richer district by nature there cannot be, than all those counties which lie at the eastern foot of the Blue Ridge; but, like whatever on this continent has been long cultivated, they are nearly exhausted. Beyond the Blue Ridge, and various other ridges lying west of it, and parallel to it, are extensive vallies, from five miles to thirty in width, the plains of which are highly elevated above the sea, but lying between mountains far more elevated. The soil of these vallies is calcareous, lying every where upon a limestone, or marble, the same as constitutes the basis of the mountains, which are themselves chiefly granite, quartz, and steatite. These vallies I traversed from Carolina to Pennsylvania, in June, 1795, with infinite pleasure: it is a delightful region, refreshed with frequent showers collected on the mountains, enjoying the ventilation and cool breezes of a northern climate, with the perpetual sunshine of a southern latitude.

In a state, the soil of which varies so greatly, in climates the most desirable, as well as the most noxious to the human frame, the value of property must differ in proportion; and that it does so, will appear in stating a few instances on each side of the mountains, and then the average of each.

On the lower part of the Rappahannock, on each side of it, land, on the banks, will sell for £1 11s. 6d.; at some distance from the river, from 18s. to £1 2s. 6d. On James River, below Richmond, £1 10s.; in a few very favorable situations as high as £4 10s.; upon James River, above the falls, at £4 10s. A few miles from the river £1 10s. and £2 5s. Upon the South-West Mountains, for no where more than £2 5s. The best red land in the counties of Orange, Albemarle, and Amherst, than which, none in nature is more fertile, or better adapted to clover and wheat, may be bought for 18s. per acre; I saw a considerable tract that had lately been purchased for 16s.

To the west of the Blue Ridge. Good land in Rockbridge county, sells for £4 10s. Land in general, including rocks and woods £1 10s. About Patten's ordinary,* for about £3 7s. 6d. A farm, at this place, was shown me by the proprietor, containing eleven hundred acres, one-third of it cleared, and somewhat cultivated, which he had lately purchased at £2 5s. per acre, which was thought very reasonable. (Immense tracts of all these mountains, of which one thousand acres would not be worth a shilling, and which have been neglected till within these two or three years, have been taken up by the land jobbers to sell, and are now sold, or selling in Europe.) About Newtown, most excellent land for pasturage will

* Inns or taverns in the country parts of Virginia, are called ordinaries.

sell for from £6 15s. to £7 10s. per acre. The average rate of land in the country about Winchester, from £2 5s. to £4 10s. in some instances, near the town, £7 10s. Upon the Shenandoah, the usual price is £1 11s. 6d.

To the west of the Allegany ridge, is a vast tract of back country in Virginia, lying upon the great Kanawha river, one of the branches of the Ohio, but little known, inhabited, or cultivated, and in which the lands sell at very low prices: forty thousand acres were, in the spring of 1795, advertised in a Philadelphia paper to be sold; the terms proposed, were 7d. per acre, one quarter to be paid in hand, and the rest in two equal annual payments; other vast tracts in Virginia and Kentucky were then also upon sale, the usual price asked for which was 1s. 1½d. per acre, with considerable time allowed for making the payments.

Average to the east of the Blue Ridge, £1 19s. 8d.; to the west of it £4 3s. 10d. As far as I know, no lands are let in Virginia; therefore, there are no means by which, with tolerable accuracy, to ascertain the rate of interest for money employed in the purchase of lands.

OF THE SOUTHERN STATES

I can give little account; in all of them the land sells at a very low rate, and lower as it lies farther south.

A merchant in Philadelphia, in the summer of 1795, purchased one hundred thousand acres of land in Georgia, beginning about four miles from Augusta, the capital of the state, and lying on the road to Savannah, at 4½d. per acre.

RECAPITULATION.

	Price per acre.			Rent per acre.			Int. paid by land.
	£	s.	d.	£	s.	d.	
New England - - - - - -	4	0	0	-		-	3½ per cent.
New York (old settled country) - -	3	7	10	-		-	3½ ditto.
Ditto (new country) - - - - -	0	9	3¾				
Jersey and Pennsylvania (old country)	4	0	0				
Ditto (new country) - - - - -	0	3	6				
Delaware and Maryland - - - -	4	17	0	0	5	0	4 per cent.
Virginia (east of the Blue Ridge) -	1	19	8				
Ditto (west of ditto) - - - - -	4	3	10				
Ditto west of the Allegany ridge, about		1	0				

Average of the old settled countries, £3 14s. 9d.

Could the interest be stated with equal accuracy, I should apprehend it would not produce much more than three per cent. when in the hands of the tenant, though the occupier and owner are equally exempt from the payment of almost any manner of tax; but very few will rent land, and none know how to cultivate it, as will be seen, when the rotation and produce of crops are noticed.

Before the Revolution, the laws established a legal interest; in some of the states, seven per cent. in others, eight per cent. and in the southern states, I believe, more. Since the Revolution, congress has never touched the subject of interest; and if the laws in the different states still remain in force, they are become obsolete; certainly no attention is paid to them, but every one makes the most advantage that he is able, of his money, as of any other commodity; and there are sufficient opportunities of making more than what was heretofore legal: this shows that land is little worthy of attention here, and accounts for emigrants from Europe, who, at first with European ideas, turn their attention to land, and wish to become proprietors of extensive estates, soon getting rid of their land, and employing their money on more productive speculations. Land in America affords little pleasure or profit, and appears in a progress of continually affording less; but it would take up too much room here, to state the foundations of these opinions.

Before I had collected, in one view, the particulars of every state, I should not have apprehended that Maryland, notwithstanding the favorable opinion I formed of it when there, in price, rent, and interest, would have stood first in the union. This state, in climate and produce. is more nearly allied to those on the south, than on the north of it; the climate is somewhat productive of those bilious habits and complaints, so dreadfully frequent immediately to the south of it; and, as in the south, the produce has hitherto been chiefly tobacco, which never was cultivated to the north; it has also ever abounded greatly in slaves; but it is more nearly allied to the northern states in its principles, and the liberality of its government; and to these and their consequences, this superiority must be ascribed. The body of the people may not be as well educated as those of New England, but they are fortunately uninfluenced by the wild theories of their southern neighbors: from hence it arises, that as men of property and education have the conduct of the government, it is carried on with the liberality that may be expected in such characters, and the best people of the country feel interested in the prosperity of it. Many persons of considerable opulence and extensive property reside on their estates, see to the cultivation of them, and diffuse knowledge, as far as they are informed themselves: more instances of this kind are to be met with in Maryland, than, perhaps, in any of the other states, and they have an influence of most beneficial tendency. To these causes I must attribute the superior value of property.

"What is the price of labor?"

September 1794. In the city of New York, seamen's wages were from £4 14s. to £4 19s.

per month: were at £4 1s. in the beginning of the summer, and at 36s. and 45s. before the war in Europe. A common laborer, as one to carry the hod, or help in clearing out a ship, 4s. 6d. per day. Carpenters, 5s. 7½d.: masons and bricklayers, 6s. 9d. and 7s. 3¾d.: all other mechanics and handicraftsmen, about 5s. 3d. These several last descriptions of people rarely work more than three days a week, as is usually the case with people of their class in other countries, where wages are too high.

July 1795. Seamen's wages were then risen to £6 15s. Nothing is allowed to laborers in New York city, except sometimes spirits to those who work on shipboard.

The average of the country in the state of New York, for agricultural labor, for six months from May-day, when hired by the month, 1s. 5d. per day; the other six months 1s. 1d.; if for less time, or by the day, 2s. may be reckoned the average of any part of the year. A foreman's wages £14 per annum; for mowing buckwheat, or other light mowing, 2s. 10d. per day; for cradling wheat, usually one bushel of wheat per day.

Exclusive of the above wages in money, every one in the country is provided with victuals, and in harvest expects at least a pint of rum, or other spirits, a day.

Wages appear to have risen, in this state, in the proportion of four to three, or thirty-three and one-third per cent. in the last three or four years.

NEW ENGLAND.

1794, autumn. Laborers by the month in summer per day, 2s.; by the month in winter, 1s. 3d.; if for a less time, or by the day, 2s. 7d. may be the average of any part of the year. Foreman in husbandry, or best working man, £18 15s. per annum. Laborers on the canal of the Connecticut, from 31s. 6d. to 40s. 6d. per month, according to abilities. Carpenters and handicraftsmen about 3s.: the wages in harvest are usually regulated by the price of maize, a bushel of which is allowed for a day's work; this year maize being high, wages are high likewise; 3s. per bushel, or per day; used to be 2s. 3d. All the above laborers, exclusive of their wages, are provided with victuals, and generally with cider to drink.

NEW JERSEY AND PENNSYLVANIA.

1794, winter. Wages in Philadelphia, much the same as in the city of New York. In the country, laborers by the month in summer per day, 2s.; by the month in winter per day, 1s. 9½d.; if for a less time, or by the day during any part of the year, 2s. 3d.; in hay time and harvest by the day, 3s. 5½d. Foreman £24 per annum. Laborers working by the piece at the Conawaga falls of Susquehannah, earn about 3s. per day, which is not too much, considering the unhealthiness of the place, and fatigue of the work.

At Elizabeth iron furnace, some of the head men have £90 per annum. All the common workmen, of which many are free blacks, have £21. All the above have their victuals found them, and in hay time and harvest the workmen expect, and drink at least their pint of rum, or other spirits, a day.

Aug. 1795. Seamen's wages, in Philadelphia, were as high as £7 17s. 6d. per month, and every ordinary seaman received it.

About the same rise of wages has taken place in these states, as elsewhere before noticed.

Somewhat less difference is paid here in wages, in winter and summer, than to the north, the climate admitting of more equal labor.

DELAWARE AND MARYLAND.

1795, summer. White laborers by the day, at any time of the year, 1s. 6d.; free blacks ditto, about 1s. Labor in harvest 4s. 6d. Free blacks by the year £8 8s.: hired slaves £7 4. Overseer, or head husbandman £22 10s. Laborers, on the canal of the Potomac, chiefly men who have worked on the canals in Great Britain, 36s. per month, board, and every necessary being likewise found them, except liquors. All the above have their victuals found them; the hired slaves are also clothed.

At the city of Washington, masons, 6s. to 7s. 2¼d. per day; carpenters, 4s. 9½d. to 6s.; negro laborers (hired slaves) 36s. per month, board and clothes.

Baltimore, mechanics, 6s. per day; common laborers, 4s. 6d.; seamen's wages £6 15s. per month.

Little difference in the rate of wages is made in these states, between winter and summer, the climate admitting of nearly equal labor throughout the year; nor does any rise appear to have taken place in them, except in Baltimore, where the demand for mechanical labor, in the construction of the new city of Washington, seems to have affected it considerably.

VIRGINIA.

Every thing here is performed by the labor of slaves, except on the west of the Blue Ridge, where they are not numerous; there the labor of the white people may be procured, during almost any part of the year, at about 2s. and their victuals; where slaves are doomed to toil, the freeman holds labor to be a degradation. Virginia is in a rapid decline, brought on by her adherence to so pernicious a regimen.

The value of slave labor I have taken considerable pains to investigate and prove, but have not been able to accomplish it to my satisfaction; it is the opinion universally received there, that it is much dearer than that of freemen; but I do not find, that any one in the country, where alone it could be ascertained, have ever undertaken the subject; some say it is more expensive by one-third, others by one-half; all agree in the fact, but none can fix the amount. The price, however, paid for the time of a slave can be easily established, and from that we must reason upon the value of his labor. Great numbers of slaves are hired out in this state by their owners, who may be overstocked, or may not have sufficient employment for them at the time; these are frequently hired by individuals, who are in want of their labor; or by the proprietors or undertakers of public works.

The usual price paid for a slave, employed in husbandry, is £9 per annum; he and his wife may be hired for £12; but the person that employs them also feeds and clothes them: several hundred were employed on the canal at the falls of James River, in the summer of 1795, all of whom were hired. As these were stout able men, they were paid for at the rate of £11 5s. each, per annum, and their maintenance* and clothing was calculated to amount to the same sum. Suppose, therefore, that the maintenance of the slave that is employed in husbandry, bears the same proportion to the price that is paid for his time; this will make the expense of such a person £18 per annum, or per day rather more than 1s. 2d. As the climate here, as in Maryland, admits of nearly equal labor throughout the year, it may be fair to estimate it at the same rate in each state; in Maryland, it appears that the service of free blacks may be had for about 1s. per day, and of whites for 1s. 6d.; therefore, the time of a slave, in Virginia, is estimated at somewhat an higher price, than that of a free black in Maryland, though at less than that of a white man. But the price that is paid for the *time*, is by no means a proof of the value of the *labor* of the slave; that can only be ascertained by the actual quantity performed, and the goodness when performed; and much more may be paid for it, than actually appears. Now, nothing can be conceived more inert than a slave; his unwilling labor is discovered in every step that he takes; he moves not if he can avoid it; if the eyes of the overseer be off him, he sleeps; the ox and the horse, driven by the slave, appear to sleep also; all is listless inactivity; all motion is evidently compulsory. Any slave, that I have seen at work, does not appear to perform half as much, as a laborer in England; nor does the business, under which the master sits down contented, appear to be half, that we require to be performed by one; if to this be added the slovenly carelessness with which all business is performed by the slave, the great number of useless hands the slave owner is obliged to maintain, the total indifference to, and neglect, not say the frequent willful destruction, of whatever is not immediately committed to his care, or within his department, and also the universal inclination to pilfering shown by them, I cannot do otherwise than acquiesce in the received opinion of the country, that slave labor is much dearer than any other; and that the price paid for the *time* of a slave, by no means shows the amount of *the value of his labor:* it certainly is much higher than it appears to be; though not knowing the quantity of labor, performed by slaves in general in a given time, in a sufficient number of instances, I have not data whereon to calculate the exact value.

RECAPITULATION.

	per day Labor in summer.		per day Labor in winter.	
In New England	2s.	0d.	1s.	3d.
New York	1	5	1	1
New Jersey and Pennsylvania	2	0	1	9½
Delaware and Maryland (white men)	1	6	1	6
Ditto free blacks, about	1	0	1	0
Virginia, perhaps equal to	2	0	2	0

The average of which will be 1s. 7¾d. in summer, and 1s. 5¼d. in winter; to this must be added the price of their victuals, which I find, in many instances in this country, is estimated at 9d. a day, except in hay time and harvest, when the workmen live something better, and have a larger allowance of spirits, or other liquors; this will raise the wages to something more than 2s. 4¾d. in summer, and 2s. 2¼d. in winter; but it is to be observed also, that as the sun sets three-quarters of an hour later, on the shortest day, at Philadelphia (which is about the centre of the union from north to south) than in London, and consequently rises as much earlier, three-quarters of an hour's labor is gained every day during the winter half year, which is a matter of no small consideration. Likewise, as it is the custom in America for all workmen, in the summer half year, to work from sunrise to sunset, and as the sun rises at Philadelphia at half past four on the longest day, an hour and a half before labor commences in England, and sets an hour and a half after it ceases, here is an additional gain of one hour and a half's labor during the other half year; from which no deductions are to be made, except that sometimes, in the very greatest heat of the weather, workmen are allowed to rest two hours in the middle of the day, instead of one as with us. This is a very great sum gained in the annual amount of labor, and leaves the difference of labor, between England and America, to stand thus:—the average of winter and summer, in America, 2s. 3½d.: average of labor in England, 1s. 4¾.: average of working hours in America, throughout the year, $12\frac{1}{16}$ hours; working hours in England, $10\frac{15}{16}$ hours; the latter hours paid by 1s. 4¾d. is to the former hours, as paid by 1s. 6½d.; therefore, were the wages in America 1s. 6½d. they would be the same as in England, but being 2s. 3½d. they are 9d. per day, or about one-fourth higher than wages were calculated to be in England, in the year 1793;* and the greatest part of this addition has only taken place within three or four years; before that time, wages were much alike in each country; and as wages, in England, are very considerably risen since the calculation in 1793, I ap-

* These men were allowed half a pound of pork each, a day, and three pounds of meal of Indian corn, which last is more than they can consume, with some other little occasional indulgencies; this was estimated extremely good keeping.

* See Young's France, Vol. I. p. 436.

prehend the wages, on each side of the Atlantic, are again nearly upon an equality; I suspect too, that in the climate of America, there will be fewer broken days in the year, or days entirely lost, than in England, where storms and long continued wet weather, either prevent labor, or render what is performed of little value. This refers only to agricultural labor; mechanical labor bears every where a much higher price; but with that I have nothing here to do.

The result of this inquiry is very different from what I expected, and from the generally received opinion; but, as it is a subject of so much consequence, I paid every attention to it; and it is the result of so many minutes, that I have little doubt of the accuracy of it: wherever any information was of a dubious nature, it was not at all noticed in this account. These wages are by no means of that unreasonable nature, that they should affect the prices of American produce, beyond what wages affect similar articles elsewhere; and it confirms also what I have generally heard, that in all the old settled country, there is no want of hands to perform the necessary demands of agriculture, particularly in a climate, in which wet or damps rarely occur, at a season when they would be injurious; or should they unseasonably occur, in which a brilliant sun would not soon take away their effects: this precludes the necessity of employing numerous hands; or of that expedition to which, in less favorable and more precarious climates, it necessarily is had recourse.

"To what circumstance is it owing, that eight bushels of wheat, raised by dear labor, are a profitable crop in the central states? the fact is curious."

With the answer to this question, the rotation and average of crops, the quantity of seed sown, and quality of the grain, are naturally connected. From the reply to the last query, it will be clear that agricultural labor is not dear, or at least not so dear as to have any material effect upon the price of the produce, beyond what labor will have in this country; nor perhaps ought it to have as much, since so little labor is bestowed upon it. As I have hitherto done, I shall divide the country into districts, according to the different descriptions and circumstances of it, and shall begin with

NEW ENGLAND.

This is a grazing country, and applicable to the rearing and feeding of cattle and sheep, producing herbage in abundance, and of excellent quality: no grain is ever exported from this district, and very little is raised in it except maize, on which, and on wheat imported from their neighbors at New York, the inhabitants chiefly depend. The plough is little resorted to, and consequently this district can afford no material information on the subject proposed; for that, we must look to

NEW YORK.

This state is undoubtedly the granary of America; and if America be, or is hereafter to be the granary of Europe, that must supply by her redundancy the wants of the latter, this must be the part that must do it.

The usual course of crops in this state, is as follows: first year, maize; second, rye or wheat, succeeded immediately by buckwheat, which stands for seed; third, flax or oats, or a mixed crop; then a repetition of the same, as long as the land will bear any thing; after which it is *laid by* without seed for *old-field:* or, *burn the woods;* first, wheat; second, rye; then maize for four or five years, or as long as it will grow; then *lay it by*, and begin on fresh woodland: or, burn the woods; wheat four or five years; then one or two maize, or as long as it will grow; then laid by for four or five years for old-field, without seed. A Dutchman's course on the Mohawk: first year, wheat; second, peas; third, wheat; fourth, oats or flax; fifth, maize: in his father's time, the produce of wheat used to be twenty bushels per acre; but he complained much, now that his land only produced ten bushels. The best rotation I met with, was in Dutchess county, where it much prevails: first, wheat; second and third, pasture without seed; fourth, maize, or flax, or oats, or mixed crop: in a good season this produced about fifteen bushels, more commonly twelve.

The land in this county has great inclination to produce grasses, the pasture being therefore good, and carrying, during the two years, a great stock; the succeeding crops are tolerably good also. Manure is rarely made use of; but what little is collected is given to the maize, which requires every support that can be bestowed upon it. Maize is sown early in the spring, and stands till October or November, growing most of the time with great vigor; in the early part of the growth, the plough is frequently used, going first along the furrows, and then crossing them in the contrary direction; and when it is grown too strong to admit an horse among it, hand hoeing is recurred to.

By so much cultivation, the whole strength of the land is thrown into this crop, which is one cause of the wheat being so deficient in quantity, and wheat, except in new land, every where follows maize; another is, the slovenly manner in which, in this succession, it must unavoidably be sown; the wheat is sprinkled among the maize immediately before the last hoeing; and as the land is thrown up in hillocks by the horse hoeing, the crop receives much damage from the weather in winter, as well as drought in summer.

Clover is just beginning to be cultivated, in consequence of which, good pasture and plenty of hay take place of *old-field*, and by the use of gypsum, astonishing crops are obtained.

A bushel of wheat or buckwheat per acre, is the usual quantity of seed; rarely either more or less, but as often one as the other. The average produce of wheat in the state of New York, has been stated to me by a very intelligent person, at twelve bushels to the acre; which agrees with the general opinion, and, I believe, is as high as it ought to be stated. The average of Dutchess county, which under proper cultivation would be a most productive, as it is a most beautiful, country, at sixteen bushels: twenty bushels are every where a great crop. The average of maize may be twenty-five bushels: above thirty is a great crop; that of buckwheat, which is very extensively cultivated, fifteen bushels. With a mode of agriculture, as before stated, it is not to be wondered at, that the produce should be so small; and it will be found that the average of this state, is superior to that of any other in the union.

How profit is to arise out of this, will now be seen; it has thus been calculated:

Rent or interest of capital, 4s. 6d.; one ploughing and harrowing, 5s. 7½d.; harvest, 4s. 6d.; seed, five pecks, 5s. 7½d.: total £1 0s. 3d. Straw pays for the thrashing. Twelve bushels, at 4s. 6d. the usual price before the present excessive rise, £2 14s. leaving a profit of £1 13s. 9d. As by another mode of reckoning, rent or interest = one bushel, ploughing and harrowing = one and a half bushels, harvest = one, seed = one, taxes, and all other small articles, = half a bushel; together, five bushels; leaving a profit of seven, which at 4s. 6d. amount to £1 11s. 6d. This has been looked upon as sufficient profit, when it was considered that maize. not wheat, is the most profitable crop of the farm, according to the common opinion of the country.

But I think it would be easy to prove, and it is so held by those who have paid most attention to the subject, that maize is every where a losing crop, and has been destructive to America; but it is not to our purpose here to inquire into the fact; should, however, this opinion not be well founded, the £1 11s. 6d. above stated as profit, certainly is not net; because the wheat and the maize must pay for their neglected waste, and also for the worn out old-field, which produces little or nothing.

Should this deduction be allowed, little profit can be found in the present mode of agriculture of this country, and I apprehend it to be a fact, that it affords *a bare subsistence*.

The quality of the wheat of this state, is the only thing that remains to be considered.

The wheat of New York is esteemed the best of any in the United States, and that grown on the banks and branches of the river Mohawk, the best in the state.

I had opportunities of examining considerable quantities of it, at Albany, in October, 1794, and found it in general of a very good quality, clean, and well dressed: the best sample that I could meet with (and which probably was as good as any that could have been produced,) weighed, by the bushel that was said to accord pretty accurately with that of *Winchester*, which is the only measure of grain known upon this continent, 64¼ lbs.: this, I was informed, was the utmost weight of wheat produced in any part of America.

The standard weight is 60 lbs. for all extra weight in all purchases, the grower is paid an additional price; and he deducts in proportion for all that falls short of it. It is good wheat that weighs 58 or 59 lbs.

JERSEY, PENNSYLVANIA, DELAWARE, AND MARYLAND,

Have so many circumstances in common, that they may, in this instance, be taken together: except Pennsylvania, none have any *backlands*, and these have only been settled since the peace, are yet not much known, and little produce has yet come to market from them. These four states much resemble each other in the nature of their climate, and quality of their soil, and, from a long continued course of bad cultivation, are much in the same exhausted state; the crops heretofore have been in the following rotation. First year, maize; second, wheat; third, *rubbish pasture.* By this frequent recurrence of the same crops, the land had become so far exhausted, as not to produce, upon an average, more than six bushels per acre of wheat; and much land still continues in the same course of cultivation; but an alteration has of late pretty generally taken place, in which one of the following rotations will be met with; first year, maize; second, wheat; third and fourth, rubbish pasture: or first, maize; second, fallow; third, wheat; fourth, rubbish pasture; but the fallow is stated to be so very imperfect, as to be little better than the rubbish pasture; or in the same year with wheat, frequently buckwheat standing for seed will be met with: either of these rotations will produce eight bushels of wheat. Clover is in some places just beginning to be introduced, and is said to increase the produce of wheat at least five bushels to the acre, in some such course as the following: first, wheat; second, maize; third, wheat; fourth and fifth, clover: or first, wheat and buckwheat; second, clover; third, maize; fourth, wheat; fifth and sixth, clover, or other variations of these crops.

In the peninsula of Maryland and Delaware, which produces the best wheat in this district, the old rotation of maize, wheat, rubbish pasture, is still continued, and the average produce of it is thought not to exceed six bushels per acre: in some instances, not more than two bushels are produced, and much is so bad as to be ploughed up again.

Not more than three pecks of wheat are sown for *corn-land wheat;* that is, wheat sown after maize, here emphatically called *corn.* From this lamentable state of ignorant cultivation, must be excepted the tract in Pennsylvania, inhabited by the Germans.

This industrious people, fortunate in possessing one of the finest parts of America, the country at the eastern foot of the mountains in Pennsylvania, have, either from superior knowledge when they arrived in the country, or superior attention to the nature of the soil and the climate, brought the cultivation of their country to a degree of excellence, which may vie with that of many of the old countries of Europe: their wheat may be averaged at eighteen bushels per acre; twenty-five bushels are frequent, and instances of thirty are not wanting; sufficient proof of what the country is capable of producing, were the culture of it well attended to. Their barns, their buildings, their meadows and pastures, are all in a style of neatness and perfection, unknown in other parts of America; by the use of gypsum they have clover, and by irrigation, meadows superior, particularly the former, to any I ever saw elsewhere, either in America or England: to them ought certainly to be given the credit of introducing irrigation into this part of America, and, I believe, the knowledge of gypsum into every part of it.

The tract, however, which they occupy, comparatively with the four states now under view, is of so small an extent, that I cannot estimate the average produce of the whole of these four states, at more than eight bushels per acre; the abundant crops of the Germans will not counterbalance the six bushel crops, and those of even less, of so many extensive parts of them. The profit arising from eight bushels, particularly as applicable to Maryland, has been thus calculated: rent or interest of capital, one bushel and a half; once ploughing and harrowing, one bushel; seed, one bushel; taxes, which are next to nothing, and all other little expenses, half a bushel; total four bushels, leaving a profit of four; straw is reckoned to pay all expenses of harvesting and thrashing, which it could not do, were it not in Maryland particularly valuable, for hay is there scarce, and all cattle are maintained in winter on straw and grain; but these four bushels cannot be fairly stated as profit; where in a three or four year's rotation, fallow and rubbish pastures intervene, their expenses must be paid for by the maize and wheat. The wheat grown in this district, particularly in Maryland, though not the heaviest, is thought to make the best flour of any in the United States; the best will weigh 63 lbs. and there, as in New York, 60 lbs. are held to be the average, according to which purchases are made.

[To be continued.]

REPORT OF THE PRESIDENT AND DIRECTORS OF THE RICHMOND AND FREDERICKSBURG RAIL ROAD.

The board, at its first meeting, appointed Moncure Robinson, Esq., the chief engineer of the company, with instructions to organize his party of assistants, and have the location of the rail road commenced as early as practicable. Both in the location and construction of the road, he was informed, that the board desired to proceed as vigorously as practicable, having due regard to economy and stability of execution. Acting under these general instructions, Mr. Robinson proceeded to organize a party of assistants and to execute during the past summer and fall, minute and extensive surveys, preliminary to the selection of any part of the route. The result of these surveys, has been the location of a line of railway between Richmond and the Mattapony, superior in every respect even to the sanguine anticipations of the board, and the execution of which, will, it is ascertained, be effected at a considerable reduction from the first estimate of the engineer.

The examinations which the engineer is now making between the Mattapony and Fredericksburg, will, it is believed, result in improvements in this part of the line, equally important. Should this belief prove well founded, it is confidently anticipated that the whole expense of the work to Fredericksburg, including the cost of depots, warehouses and water-stations, locomotive engines, cars and carriages, will not exceed an aggregate sum of 650,000 instead of $763,182 21 cents, the first estimate.

At a meeting of the board on the 2nd of October, the engineer was authorised to put under contract in December following, such portion of the line as might then be in readiness. The portion then in readiness embraced 27 miles between Richmond and the North-Anna, and was put under contract by the engineer on the 27th of December, agreeably to previous notice. The work was undertaken generally by highly industrious and responsible contractors, at reasonable prices, and has so far been prosecuted by them with great energy. In consequence, however, of the unfavorable winter and spring, as much progress has not been made towards the completion of their contracts, as it was expected would have been made by this time, and it is feared that the same cause may prevent in some cases a reasonable profit being realized by the contractors. Latterly the work has been prosecuted under more favorable circumstances than existed in the winter and spring, and the anticipation of the board, that this first division of the road would be completed by the close of the present year or very early in the next, they feel confident will now be realized.

The president was authorized at the first meeting of the board, to make purchases of real estate in the City of Richmond for a depot. Under the authority given him, he has purchased lots No. 477, 478, and parts of lots No. 496 and 789; lot No. 477, being at the corner of H and Eighth streets, lot No. 496, next above it, lot No. 478 in its rear, and lot No. 789 next below. By the act incorporating the company, it was requisite that the point at which the rail road was to terminate within the corporation should be approved by the common council. It appearing to the board most expedient, to conduct the rail road from the Richmond Turnpike along H street to a point at or near the intersection of the said street and Eighth street, and for the present to terminate the same by suitable connections with the contemplated warehouses and workshops of the company on the lots before mentioned, a resolution was adopted on the 22nd of December, 1834, requesting the approbation of the common council to this plan, and on the 23rd of that month the common council approved the proposed location of the road and present termination of the same, and authorized the prosecution of the work within the limits of the city on the said location. The warehouses and workshops have since been put under contract and are now in progress, and no doubt is entertained that they will be ready for use at as early period as will be necessary to meet the construction of the first division of the road before mentioned.

Arrangements have been made for placing on this portion of the road immediately on its completion the requisite engines and cars for the accommodation of the trade and travel. So soon also as this portion shall be ready for use, Messrs. Edwin Porter & Co. have agreed to connect with it their lines of stages and steamboat transportation to and from Washington City, and to deliver and receive passengers and their baggage on and from the cars of the company. As the accomplishment of this portion of the road will reduce the distance to Fredericksburg, now 67 miles, to 59 miles, and the time of travelling it more than one-third, it is obvious that the whole travel through Virginia on the northern and southern mail route must pass upon the rail road as soon as this first division of it shall be in readiness for use.

In view of this result the board confidently anticipate being enabled to declare a dividend to the stockholders in little more than twelve months from the present time, and before much more than fifty per cent of the stock shall have been paid in.

At an early meeting of the board Dr. Joseph M. Sheppard one of their body, was requested to make proper arrangements with the owners of such lands on the route as were required for the purpose of the company, and in those cases in which no agreement could be made with the owners, to take proper measures to have lands condemned and damages assessed according to law. The board are pleased at being enabled to state to the stockholders that the benefits of the improvem nt to the country through which it passes, appear to have been generally appreciated by the land owners. In most cases, releases of damages have been freely given, and in others where it has been necessary to apply to the courts for the appointment of freeholders to assess damages, their awards, except in a few instances, have been fair and reasonable.

A different view of the subject, by the owners of lands, or by commissioners, would scarcely have been anticipated. Forming as this rail way does a link in the great line of communication between the north and south, and executed on a route so cheap and favorable, there is every reason to believe that in a very short period the maximum dividend allowed by the charter may be expected from the northern and southern travel. When that period shall arrive, it would seem to be the clear policy of the company to charge on the transportation of produce and merchandize tolls very little, if at all, higher than may be necessary to pay the expenses of transportation, and to look for the profits of stockholders, to the travel chiefly, perhaps entirely.

The act incorporating the company, authorized subscriptions to be received to the amount of $700,000, of which three-fifths would have been $420,000. The subscriptions actually received during the ten days that the books were originally kept open, amounted to $305,200; being $114,800 less than three-fifths. One of the first questions before the board was as to the expediency of re-opening the books of subscriptions. Satisfied as the board was of the future productiveness of the stock, they entertained no doubt that if the books were re-opened for the purpose, there would be a prompt subscription on the part of individuals of the balance requisite to make up the three-fifths, but they resolved in the first instance to offer to the corporation of Richmond, the option of subscribing for this balance, or for any portion thereof. The common council declined acting upon the subject. After they so declined, the board allowed the books to be re-opened on the 19th of November, 1834; and subscriptions were received on that day, to the amount of $44,600. On the same day a memorial to the general assembly was adopted, asking a subscription by the commonwealth when three-fifths of the capital stock should have been subscribed by individuals. While this subject was before the general assembly, the board had reason to believe that the deficiency in the subscription of three-fifths by individuals, though small, might yet be urged as an objection to the usual subscription in such cases by the state, and on the first of January, 1835, the books were re-opened and additional subscriptions received to the amount of $75,000; making the whole sum subscribed by individuals $424,800, or 4,800 more than three-fifths. After this, an act was passed authorizing the board of public works to subscribe on behalf of the commonwealth, and requiring that board to make the subscription, when it shall appear that at least one-fourth of the private subscriptions of not less than three fifths of the capital stock have been actually paid up, and when certain other conditions are complied with. All these conditions will be immediately complied with, and the board of public works, it is presumed, will thereon make the subscription. When this subscription shall have been made, the whole capital stock will be subscribed that is at present allowed by the charter of the company.

In their applications both to the common council of Richmond and to the legislature of Virginia, the opinion of the board was expressed as to the future productiveness of the stock. The gradual rise in its price from par to seven dollars and ten cents per share above par, furnishes strong evidence that, in the judgement of the community, that opinion is well founded. The board now venture to express their belief that within a very short period after the completion of the work ample evidence will exist of its value in adding to the trade of the city and developing the resources of the state.

A branch rail road which has been projected from the neighborhood of Taylorsville to the South West Mountain, for which it is understood a charter will be asked at the next session of the legislature, must add largely to both the trade and travel of the road, and may be expected to stimulate the industry of the region through which it will pass, by conveying its products more cheaply and quickly to market. A rail way to connect the Richmond and Fredericksburg Rail Road with that between Petersburg and the Roanoke, will, it is believed, be equally an object of legislative attention. The execution of these two works must promote greatly the public interest and convenience, and at the same time add largely to the productiveness of that committed to the undersigned.

With such motives to impel the rapid completion of the enterprize, the board have made all their arrangements to effect the work between Richmond and Fredericksburg at the earliest practicable period. The location having proceeded beyond the North-Anna, a resolution was adopted on the 16th of May, 1835, authorizing the engineer to put under contract from time to time, further portions of the line. And it is now confidently believed that the whole line between Richmond and Fredericksburg will be in readiness for the transportation of passengers, merchandize and produce, in eighteen months from the present time.

The following persons were unanimously re-elected president and directors, to continue in office until the next annual meeting, to wit:

JOHN A. LANCASTER, President,

NICHOLAS MILLS,
CONWAY ROBINSON,
JAMES BOSHER,
RICHARD B. HAXALL and
JOSEPH M. SHEPPARD, } Directors.

WM. P. SHEPPARD, Secretary,
R. F. & P. R. R. C.

22*d June*, 1835.

THE SHEEP DOG TAKEN.

Riga, *May* 9, 1835.

Sometime last fall a strange dog commenced depredations among the sheep in Avon, destroying some nights between 20 and 40. He soon became the terror of the town, and various measures were resorted to by individuals to destroy him, but without effect. To such an extent were his depredations carried, that at last the people turned out *en masse*, and drove him from the town; but not, however, until he had killed between three and four hundred sheep—merely sucking the blood and seldom feasting upon the carcasses.

He was next heard of in the vicinity of Pine Hill, Genesee county, last winter, where rising of one hundred sheep became his victims. From that place, as at Avon, the people, before getting rid of him, were obliged to make a general turn out. The dog was driven into Bergen, and in that town and this, (Riga) he has within the last two or three months, destroyed over 300 sheep and lambs, having been alternately driven from one town to the other.

Although the dog has been hunted by various individuals, (the army often amounted to hundreds) since he took up his unwelcome residence in the town last named, and notwithstanding some of the best marksmen in these towns, as well as those where he has pursued his work of death for six months past, have made frequent shots at him, he has never to my knowledge, asked for quarters, nor was he finally conquered until this evening.—It was yesterday determined to make a general assault upon this common enemy, and take him if possible; and a reward of about $80 having been previously offered, by a subscription for his scalp, about two hundred persons belonging to this town and to Bergen, headed by General, Major, Colonel, Captains, and other necessary officers, took up their line of march to-day for the south part of this town, where he had last been seen, and about noon routed and drove him into what is called Adams' Swamp, which was immediately surrounded; dogs were sent in to drive him out, and about six o'clock he emerged from the woods, and in crossing the road leading from Mr. Adams' to Buel's corners, was shot through the heart by Roswell Parish, Jr. of this town, a lad aged about 17 years.

By the blowing of horns and firing of guns, the company was soon congregated—the fallen foe was placed in a wagon—the company were formed into a double file, at the head of which as a mark of honor, was placed the fortunate young marksman. The procession then marched to Riga corners, where the dog was hung up by the neck and a general salute fired—after which they proceeded to Bergen corners, where they took the skin from the dog and stuffed it.

From the St. Louis Commercial Bulletin.

PETRIFIED BUFFALO.

This extraordinary curiosity was discovered about two years since by some trappers belonging to Captain Bent's Company, lying on the side of one of the beaver dams of Rio Grande of the north (a stream emptying itself into the Gulf of California) whose waters, it is said possess the petrifying qualities to an eminent degree; its shores abounding in specimens of various animal and vegetable productions in a petrified state. The petrified Buffalo is described by those who have seen it, to be as perfect in its petrifaction as when living, with the exception of a hole in one of the sides, about four inches in diameter, around which the hair has been worn off, probably by the friction of the water, in which it must have lain for ages past to have produced such a phenomenon. The hair on the hump, and shoulders, neck, forehead and tail, though concentrated into almost a smooth surface, may be easily discerned. The horns, eyes, nostrils, mouth and legs, are as perfect in their stone as in their pristine state.

The country in which this rare specimen was found, is inhabited by the Euteaux, a roving tribe of savages, who subsist, a great portion of their lives, on insects, snakes, toads, roots, &c. This tribe being particularly hostile to the whites, renders the acquisition of this curiosity an undertaking not a little hazardous. Notwithstanding this, and many other difficulties to be surmounted, such as distance, expense, &c. our enterprizing citizen, Captain Charles Bent, contemplates procuring and bringing the specimen to the United States with him on his return from Santa Fe, during the ensuing autumn. We heartily wish him success in his praiseworthy undertaking.

From the Leesburg (Loudoun) Genius, June 13.

THE HARVEST.

The time is near at hand when our farmers are wont to cut their harvest. Sad and gloomy is the prospect, not only in this county, but as far as we have heard, with very few exceptions, throughout the wide and diversified country. There are some farmers in Loudoun, who, owing to the localities of their farms, will make nearly an average crop; but they are few. By far the greatest part will not reap more than their seed, with perhaps a sufficiency for domestic use and enough to defray the expenses of harvesting. Others will not make their seed. This is certainly very discouraging, and must have a tendency to enhance the price of wheat and flour very considerably.

From the New York Star.

AMERICAN CHAMPAGNE—TRENTON HEIDSIECK.

We have been informed by a gentleman who is thoroughly conversant with the subject, that the universally favorite and fashionable wine champagne, is manufactured or rather counterfeited at Trenton, New Jersey, to an incredible extent. A large establishment has been built, warehouse, laboratories, &c. for three or four hundred boys and girls, making wicker baskets, and an immense number of bottles, branded corks, such as "anchor," "hard," "comet," "Joly," &c.—and also, expert alchemists in compounding these articles, imported for the express purpose from the vineyards of *la belle France*. Well, if these precious drinks are from the incentive of high prices to be counterfeited, we know no more exquisite domestic nectar than our famed Newark cider, which, with all the honey in our market, have, we learn, been bought up for the Trenton factory. Such a composition must be infinitely superior to the mock champagne manufactured in France, which is impregnated often with the deleterious admixture of sugar of lead. The Trenton Heidsieck, with its leaden caps and false bottomed bottles complete, bring, we hear, a ready sale at $7 the dozen, in baskets. A gourmand, an epicure we should say, was most beautifully bamboozled the other day with this cheap champagne, and boasted at a dinner party what an admirable bargain he had made.

For the Farmers' Register.

CULTIVATION OF MUSHROOMS.

Whoever has been accustomed to eat mushrooms, will certainly allow them to be one of the greatest dainties the earth affords, especially the *morel*, *truffle*, and *champignon*. The morels chiefly appear in April, and the truffle about that time may be dug out of the ground; for they never appear above the earth. Those who make it their business, in foreign countries, to gather the truffles, have only one way to find out where they grow, and that is by the help of a hog, which they lead in a string through the woods, suffering him to root the earth as he goes along; for swine being very voracious of them, discover them by their smell, and turn them out of the ground. These kinds have never, I believe, been cultivated, although they are sometimes found upon our plains and commons. The champignons may be raised in gardens in the following manner. Dig a trench six inches deep, lay in it the dung of horses, mules, or asses, then cover the dung about an inch thick with fresh earth, such as is just taken from under the turf, rather sandy than otherwise, and then cover the whole bed with straw or dry litter, as well to defend it from frost in winter, as from the scorching heat of summer's sun. The bed being thus prepared, water it twice or three times a week, without taking off the covering of straw, and in about a month's time the mushrooms will begin to appear. These beds must be made every month to produce mushrooms all the year. The late famous Mr. Harrison, of Henly, made mushroom beds much after the same manner, only instead of horse dung, he made use of old thatch, which turned musty and grew mouldy much sooner than horse dung, and would produce mushrooms quicker, and in greater plenty. Half rotted straw, moistened with lime water, will also produce mushrooms in great abundance. The cuttings of white poplar, steeped in hot water, well fermented with yeast, will produce very good mushrooms in a few days; and the loose chips of the same tree, being buried in a decayed hot bed, will do the like.

To make mushroom catsup.

Break them into an earthen pan, strew salt over, and stir them now and then for three days. Then let them stand for twelve, till there is a thich scum over; strain, and boil with Jamaica and black peppers, mace, ginger, a clove or two, and some mustard seed. When cold bottle it, and tie a bladder over the cork—in three months boil again with new spice, and it will keep two years.

To dry and powder mushrooms.

Lay them on tins or seives in a slow oven till they are dry enough to beat to powder: then put the powder in small bottles, corked, and tied closely, and kept in a dry place. A tea spoonful will give a very fine flavor to soup or gravy, or any sauce. It is to be added before serving, and one boil given after it is put in.

To stew mushrooms.

Sprinkle with salt and pepper—simmer slowly till done; then put a small bit of butter and flour, and a little cream: give them one boil and serve with sippets of bread.

S.

For the Farmers' Register.

VEGETABLE INOCULATION. KNOWN AND PRACTISED 120 YEARS AGO.

The following experiment of Mr. Lawrence, was made 120 years ago, which he mentions in his "Clergyman's Recreation," relating to the jessamine.

"Suppose a plain jessamine tree spreading itself into two or three branches from one common stem near the root. Into any one of these, in August, inoculate a bud taken from the yellow striped jessamine, where it is to abide all winter, and in the summer when the tree begins to make its shoots, you will find here and there some leaves tinged with yellow, even on the other branches not inoculated, till by degrees, in succeeding years, the whole tree, even the very wood of all the tender branches, will be most beautifully striped and dyed with yellow and green intermixed." He adds, that "though the inoculated bud should not shoot out, or that it should live but two or three months, and after that, happens to die or be wounded by accident, yet even in that little time it will have communicated its virtue to the whole sap, and the tree will become entirely striped."

S.

For the Farmers' Register.

SUBSTITUTE FOR COFFEE.

A German physician, by the name of Mark, discovered that acorns may be used with advantage as a substitute for coffee. Considering the high price of this article, it will prove a discovery of much importance.

S.

For the Farmers' Register.

SUBSTITUTE FOR TEA.

The wood of the tender branches of the sassafras, dried in the shade early in the month of May, makes an excellent substitute for foreign tea. The bark has a stronger taste and smell than the wood; and from the quantity of volatile oil it contains, is too stimulating and heating. The tree is cultivated in Jamaica, and the inhabitants commonly employ the root in making tea.

S.

For the Farmers' Register.

QUICKENING GERMINATION.

"M. Humboldt has made several experiments on the subject of the germination of seeds in the oxymuriatic acid diluted with water, and has found that this acid has a remarkable effect in accelerating the progress of vegetation. Cress seed, when thrown into the fluid at the temperature of 88, showed germs in three hours, while none were seen in water in 26 hours. Professor Pohl, at Dresden, produced, in this manner, vegetation from dried seeds 100 years old; and Messrs. Jacquin and Vander Schott, at Vienna, have caused the growth of old seeds in the botanical garden which had resisted every other method."

S.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

[Continued from p. 167 Vol. III.]

On the Merino, or Spanish Sheep.

The sheep of this foreign species have horns of a middle size, of which the ewes are sometimes destitute; faces white; legs of the same color, and rather long; shape not very perfect, having a piece of loose skin depending from the neck; bone fine; pelt fine and clear.*

The wool of the Merino sheep is uncommonly fine, and weighs upon an average, about three pounds and a half per fleece. The best Merino fleeces have a dark brown tinge on their surface, almost amounting to black, which is formed by dust adhering to the greasy, yolky properties of its pile; and there is a surprising contrast between it and the rich, white color within, as well as the rosy hue of the skin, which peculiarly denotes high proof. The Merinos are natives of the northern provinces of Spain, and were first introduced into this country in the year 1787; but it was not until 1792 that any effectual measures were adopted towards improving our native breeds by a Spanish cross. In the last-mentioned year his majesty George III. received several rams of the Negretti breed; but so great was the force of prejudice, that notwithstanding the manufacturers confessed the wool of the Anglo-Spanish cross to be of prime quality, yet not one individual bid for it a price at all equal to what they paid for good Spanish wool. From these sheep imported by his Majesty, and from the great exertions of the late Lord Somerville, (who at an immense expense imported a flock of choice Merinos,) great benefit has been derived to the wool, by crossing this sort with the best British breeds, although the produce of the cross has not been improved in shape. The most successful cross has been with the herfordshire, the fleece of which is heavier, in proportion to the carcass, than that of any other known breed in Europe, the average weight of the fleeces of two-shear ewes being estimated at four pounds and a half avoirdupoise, in an unwashed state; and the fleece of a fat wether of the same age will be from five to seven pounds.

From the high prices which Anglo-Merino wool commanded during the late war, great expectations were formed of the advantages to be obtained from the introduction of Spanish sheep, which were accordingly imported to a great extent, and sold at very high prices†. Of some of the crosses with that breed, we have already seen the result: its effect has also been tried in Sussex, upon the south-down sheep, by Lord Sheffield, and other eminent breeders, and the wool of the flocks was thereby considerably improved; but it was accompanied by some capital defects, not to be compensated by any improvement of the fleece—tender constitution, slow feeding, bad shape and deficiency in the number of lambs. This new breed has therefore been generally given up in Sussex,* and also in Wiltshire, where it had been extensively tried.† There are still, however, many large flocks of pure Merinos, the proprietors of which affirm that their qualites are not only uninjured, but have even been improved by their naturalization in this country. So far as regards the carcass, this may be true; but some of the evidence before the late committee of the House of Lords goes to prove, that the wool has become more harsh; a statement, it may be observed, which is corroborated by the difficulty in selling it, and rendered probable by the difference of climate and of treatment to which the animal has been exposed;‡ though at the same time it is admitted, that the weight of the fleece has been increased, and that the price is double that of south-down.§ The flesh is also fine; but, notwithstanding the improvement of the carcass, the return in mutton is still deficient.¶

In Spain, the sheep from which these flocks have been obtained, are bred in the northern provinces of the kingdom of Leon, and of Segovia and Soria, in Old Castile, and the district of Buitrago, in New Castile; from whence, after being shorn, they are driven southward at the approach of winter, and remain dispersed over the plains of Estremadura, La Mancha, and Andalusia, until the return of summer, when they travel back to their native pastures; and whether from instinct or habit, they are said to display symptoms of restlessness as the time approaches for their change of pasture. They are, in consequence termed *Trashumante* flocks—those which are stationary being called *Estántes;* and there is a code of regulations, sanctioned by the authority of law, for the government of the shepherds during these periodical migrations. The ancient pasturages in the south are secured to them at a fixed rate. A strip of land, of considerable width, is left in pasture at each side of the road for their accommodation, without which they could not travel with conve-

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* Facts and observations on British Wool. 4to 1799. pp. 4, 5. Minutes of evidence before the Lord's Committee on the wool trade, in 1828. pp. 69, 234.

† At the sale of sheep belonging to his Majesty George III. at Kew, in 1809, rams, of the Negretti and Paular race—two of the most esteemed breeds in Spain—sold from 25 to 75 gs. each; and ewes, from 14gs. to 55gs.: all the latter, and many of the former, being full-mouthed. The entire sale averaged, as follows:—

40 rams	1869 gs.	Average 46¾
60 ewes	1958 gs.	32⅔
100	3827 gs.	Total Average £40 3 7

* Agricultural Survey of Sussex, p. 310, and evidence of Mr. Elman before the committee of the House of Lords, on the wool trade, 1828.

† Evidence of Mr. Cunnington, ditto, p. 193.

‡ Evidence of Mr. Sheppard, Chairman of the London Committee on the wool trade, before the committee of the House of Lords, on the wool trade, 1828.

§ Evidence of Mr. Hubbard, of Leeds, ditto, ditto; and of Mr. Varley, of Leeds, ditto, ditto.

¶ Evidence of Mr. Webb Hall, of Sneed Park, Gloucestershire, ditto, ditto.

nience; and the greatest attention is paid to secure these privileges. By thus removing them at the different seasons from north to south, and back again, they are kept in a nearly equal temperature and it probably is to that advantage that the superiority of the wool of the Trashumante flocks is to be attributed; that from those which remain stationary, being far inferior; as a proof of which, the *Caçeres*, or Estremaduran wool, grown in one of the central provinces, commands little more than half the price of the *Leonesa*. It must, however, be admitted that, in Spain, it is a disputed point whether the travelling flocks are really benefited by the equality of climate thus obtained; some stationary flocks in the province of Segovia being said to produce as fine wool as any of the Trashumante.

If the supposition that the change of pasture be correct, it must follow that these sheep, when exposed to the variable climate of this country, will necessarily change the quality of their fleece; upon which, climate is known to have the greatest influence. It may, indeed, be said, that the change might even then be advantageous; for a certain degree of cold is rather favorable than otherwise to the growth of fine wool; and its improvement in Saxony, into which country the Spanish breeds were introduced about half a century ago, might be adduced as an instance in point. But in Germany, these sheep are regularly housed during the winter; they are also kept, during that season, on dry fodder, which may be supposed to have a material effect on the fleece, for the Spanish sheep are kept on bare, and generally burnt up, pasture, without ever tasting artificial fiood; and our finest woolled flocks are maintained on the scanty herbage of the downs.

In France—where the royal flock of Rambouillet, picked from the best in Spain, was introduced in 1785*—the sheep suffered greatly by the cold until housed; and although the Merino breed has been since naturalized in that country, and still retains the fineness of the texture of the wool, yet it looses in softness and in strength of staple.

The Trashumante flocks have existed from a very early period in Spain. There is an ancient tradition that the original stock was obtained from this country; but it has not been traced to any authentic source.* In the sixteenth century they were calculated at seven millions; but their numbers have since much diminished, and they are now supposed not to exceed five.

The chief flocks are those of *Paular*, which belong to a richly endowed monastery of that name in Segovia;—of *Negretti*, the property of the Marquess of Campo d'Alange;—of the *Escurial*, formerly belonging to the crown; and those owned by the Duke de l'Infantado, the Marquesses d'Iranda and Péralès, and Count San Rafael; each of which consists of from 40,000 to 60,000, and the average weight of the fleece is estimated at 5lbs.†

The total export of Spain formerly amounted to about 32,000 bags, of 250 lbs. each; but this is daily diminishing, in consequence of the rapid increase of the German fine wools, and of the great depreciation of prices in this country. But little is consumed in the manufactures of Spain, especially since the revolution, which put a stop to the great royal manufactory of Guadalaxara. An attempt was, indeed, recently made to re-establish those magnificent works, through the medium of a public company formed in London; but, like most of such projects, it failed. It is, however, not improbable that the present extremely low prices of wool, in Spain, will induce the Spaniards to manufacture for themselves: if not, the Trashumante flocks will decrease, for the fleece being the sole object of that system, it will be no longer worth pursuing; if the wool should continue, as at present, a mere drug in their markets; and it has, besides, been long considered as prejudicial to the real interests of the kingdom, by its retaining immense tracts of land in the southern provinces in comparatively unprofitable pasture.

*By a treaty made between France and Spain, during the French Revolution, 5000 ewes and 500 rams, of the best Spanish breeds, were placed at the disposal of the French Government.

* See, on this subject, Pennant's British Zoology.

† Bourgoing: *Tableau de l,Espagne Moderne, Vol. I. Ch. III.* This estimate is, however, higher than the usual average.

SYNOPSIS OF THE DIFFERENT BREEDS OF SHEEP IN GREAT BRITAIN.

				Average weight of wool, per fleece.	Average weight of wethers per quarter	Years old when killed.
				lbs.	lbs.	
Heath,	large horns,	black faces and legs,	coarse long wool,	3½	14	4½
Exmoor,	horned,	white faces and legs,	long wool,	4½	15	2½
Norfolk,	large horns.	black faces and legs,	fleece of middling length and quality,	3½	18	3
Wilts,	horned,	white faces and legs,	short and moderate fine wool,	2¾	20	3
Dorset,	small horns,	ditto,	fleece of middling length and quality,	4	18	3½
Dean Forest and Mendip,	ditto,	ditto,	fine short wool,	2	14	4½
Dishley,	polled,	ditto,	long wool,	6	22	2
Lincoln,	ditto,	ditto,	ditto,	11	25	3
Dishley and Lincoln,	ditto,	ditto,	ditto,	6½	23	2
Romney Marsh,	ditto,	ditto,	ditto, good quality,	7	24	2½
Tees Water,	ditto,	ditto,	ditto,	10	26	2½
Dartmoor Natts,	ditto,	ditto,	ditto,	7	22	2½
South Down,	ditto.	gray faces and legs,	fine short wool,	3	18	2
Cannock Heath,	ditto,	gray faced,	ditto,	3	20	3
Ryeland,	ditto,	white faces and legs,	very fine short wool,	2½	14	4½
Shropshire Morf,	polled and horned,	speckled faces and legs,	short fine wool,	2	15	4½
Cheviot,	polled,	white faces and legs,	short wool,	3	16	4½
Improved Cheviot,	ditto,	ditto,	ditto,	3¾	19	3½
Herdwick,	ditto,	ditto,	ditto,	2	10	4½
Shetland,	ditto,	colors various,	fine cottony wool,	1½	8	5
Pure Merino,	horned,	white faces and legs,	short and very superior wool,	3½	16	6
Half Merino,	partake of the various description of the crossed breed,		ditto,	3 to 5	—	—

On the Breeding and Management of Sheep.

Before we proceed to discuss this branch of rural economy, it will be necessary to state the names or terms by which these animals are generally known at different ages; though even these vary in different counties.

From the time of weaning to the first shearing, the males are denominated *hogs, hoggets*, or *hoggerels*, after which they receive the appellation of *shearing, shearling, shearhog*, or *diamond tups*, or rams; after they are called two, three, or four shear, according to the number of times they have been shorn.

When male sheep have been castrated, they are termed, from the period of weaning to that of shearing, *wether* or *wedder hogs*, then *shearings, shearlings*, &c.; or they are afterwards denominated *two-tooth*, then *three*, or *four-tooth wethers*, and finally, *full-mouthed*.

The females have the appellations respectively following:—from the time of weaning to the first shearing they are termed *ewe* or *gimmer hogs;* they then take the name of *gimmers* or *theaves*, which continues only for one year, after which they are invariably denominated *two, three*, or *four shear ewes;* and, when old, they are termed *crones*.

Sheep, in general, renew their first two teeth from fourteen to sixteen months old, and afterwards every year, about the same time, until they are turned three years old, or rather *three shear*, to speak technically, when they become full-mouthed; for, though they have eight teeth in the under jaw before, it is believed they only cast or renew the six inside ones. But, with regard to this point, there is a difference of opinion among experienced shepherds, some of whom conceive that they cast only six, while others think they renew the whole eight fore-teeth.

With respect to the selection of sheep, as an article of *live stock*, the same principal of symmetry of form, and other requisites to the formation of a good breed of black cattle, which have been already specified, are equally applicable. The breeder, or grazier, should also carefully examine the nature of his land; and having attentively weighed its relative degrees of fertility, and his various sources for supplying food, he may then proceed to purchase that breed, which, after mature consideration, he has reason to believe is best calculated for him. In this point, the introductory view of breeds and varieties, already referred to, will probably afford some guide; but there are some additional hints, to which we would call his attention. In the first place, therefore, he should take care not to suffer himself to be led into needless expense, in purchasing fashionable breeds, by which his affairs might become involved, and his exertions in other objects be rendered nugatory; though he should be scrupulously attentive to procure the best blood of that particular breed on which he may fix. Secondly, the difference of the land, whence the sheep are to be purchased, ought to be attentively weighed; for with sheep, as with cattle stock, if any breed be brought from a rich to an inferior soil, it must necessarily decrease in value and condition. Not only, therefore, must sheep be suited to the pasture, but they should also be purchased, if possible, from poorer land than that of the intended proprietor, for on attention to this last point depends their immediate thriving.

Having thus noticed the general objects in selecting sheep, we now proceed to state some particular points that will demand the breeder's attention; and, as in all cattle the male has the greatest influence, we shall specify those requisites which are essential to a good ram.

"His head should be fine and small; his nostrils wide and expanded; his eyes prominent, and rather bold and daring; ears thin; his collar full from his breast and shoulders, but tapering gradually all the way to where the neck and head join, which should be very fine and graceful, being pefectly free from any coarse leather hanging down; the shoulders broad and full, which must at the same time join so easy to the collar forward, and chine backward, as to leave not the least hollow in either place; the mutton upon his arm, or fore-thigh, must come quite to the knee; his legs upright, with a clean, fine bone, being equally clear from superfluous skin, and coarse hairy wool, from the knee and hough downwards; the breast broad and well forward, which will keep his fore-legs at a proper wideness; his girth, or chest, full and deep, and, instead of a hollow behind the shoulders, that part, by some called the fore-flank, should be quite full, the back and loins broad, flat, and straight, from which the ribs must rise with a fine circular arch; his belly straight; the quarters long and full, with the mutton quite down to the hough, which should neither stand in nor out; his twist (i. e. the junction of the inside of the thighs) deep, wide, and full, which, with the broad breast, will keep his four legs open and upright; the whole body covered with a thin pelt; and that with fine, bright, soft wool."*

Such is the description of the animal recommended by Mr. Culley, who observes, that the nearer any breed of sheep comes up to it, the nearer they approach towards excellence of form; and there is little doubt, but if the same attention and pains were taken to improve any particular kind, which have been bestowed on the Dishley breed, the same beneficial consequence would be obtained. It should, however, be remembered, that symmetry consists in that shape which is best suited to the soil on which the animal is to be bred; and thus that which may be thought perfect in a Leicester sheep may be found inferior in a South Down or a Cheviot.

In addition to the symmetry and other requisites above specified, the *pelt*, or coat, should also be attentively investigated, lest it be *stitchy haired*, in which case the wool will be so materially damaged, in the course of two years, that the injury cannot be remedied for a long period, unless the whole flock be changed. But the fineness of wool is not the only criterion by which it should be judged even in the short wooled breeds: the *staple* is also of the greatest importance; though on that material point—on which the substance and wear of the cloth so much depends—it may, however, be observed that the, now fashionable, Saxon wool is far inferior to the fine Spanish growths of Leonesa and Segovia.

Ewes generally breed at the age of fifteen or eighteen months, though many experienced breeders never admit the ram till they are two years

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* Culley on Live Stock, pp. 103, 104.

old. Much, however, depends, in this respect, on the goodness of the food, as well as on the forward or backward state of the breed. The choice of ewes, therefore, ought to be made with care and discrimination, not only as to the characteristic marks, which ought to be the same as those of the ram, but also with regard to the breed; for, with sheep, as with other cattle stock, no certain degree of excellence can be attained, unless the female possesses an equal degree of blood with the male. In particular, a purchaser should see that the animals be sound; and, in order to ascertain this point, it will be advisable to examine whether the teeth are white, the gums red, the breath not fetid, the eyes lively, the wool firm, and the feet cool; qualities these which afford a certain criterion of health or disease.

Of equal importance is the proper selection of rams, even of the same breed and apparent qualifications: in attending to which point, the conduct of the Duke of Bedford (whose memory every real friend to his country must revere) deserves to be imitated by all attentive breeders. Previously to drawing off the ewes for tupping, it was his constant practice to select every ram, together with the lambs begotten by it in the preceding year, from the rest of the flock, and confine them in separate pens, in order that he might examine them and their issue, by the value of which he was guided in his determination.

Ewes bring forth one, two, and sometimes three lambs,* after a gestation of five months, or twenty weeks; hence the sheep farmer, or breeder, may, in general, by considering whether he has sufficient grass to support the ewes and their progeny in the spring, ascertain the most advantageous period for lambing; or in the event of a failure of pasturage, whether he has a stock of turnips adequate to their maintenance till there is a sufficient herbage to supply them with food.

The usual time of yeaning is towards the end of March, or early in April; consequently, the rams are, according to the general practice, admitted in the commencement of October. But in the county of Dorset, where the ewes are, from a peculiarity in their constitution, capable of bringing lambs at a much earlier period;* and also in the southern and south-western districts, where large quantities of house-lamb are raised for the table, it is most profitable to deviate from this plan, and so to admit the ram, that the lambs shall be dropped from four to six weeks, or more, earlier.

The strength and beauty of sheep stock also greatly depend on the number of rams allowed to serve the females. While the former are young, fifty or sixty should be the utmost extent; and, as they advance in years, the number may be gradually increased; without these precautions, the lambs would not only be deficient in number, but also in point of strength.

Various expedients have been resorted to, in order to make the ewes *blossom;* among others, is the practice of worrying them with small dogs, kept for that purpose, in consequence of which they become warmed, so that they seldom refuse the ram. In Leicestershire, a practice was introduced, at Dishley, of employing *teasers;* that is, inferior rams with a cloth so fited on them, as to prevent copulation; and whose duty it is to prepare the ewes for the visits of the sultan of the fold. But it is much better, and certainly a more rational plan, to keep the rams and ewes in different pastures, till the time when they are intended to be brought to the rut: and for about five or six weeks before, let them have somewhat better pasture than they are usually accustomed to, by which expedient they will be disposed to take the ram the sooner. In fact, it is with sheep as with other cattle, the female must be in a certain state desirous of the male before the latter will attempt to serve her; and this object can only be artificially attained by increasing the richness of their food a short time before they are required to couple; for, in proportion to the excellence or poverty of their food, the bodily vigor of these animals must evidently increase or diminish.

During the period of gestation, ewes require great attention, lest any accident should occasion them to slip their lambs; and, if that should take place, it will be proper to separate them instantly from the rest of the flock. Where they are not pastured upon open downs, or moorland, the best plan is to keep them in the same manner as cows, while going with calf, namely, upon a moderate, or tolerably good pasture, where no object can disturb them; and it is also advisable to give them turnips, or similar green food, under the like precautions, till within the last two or three weeks before their yeaning. In the breeding of cattle, indeed, it is a maxim which ought to be steadily kept in mind, that nothing can be more prejudicial to the females than to fatten them during gestation; and with respect to ewes in particular, this rule should be more carefully observed than with regard to any other animal; for if they be fed too high while they are going with lamb, they will undergo great difficulty and pain in yeaning: whereas, unless they are put into a little heat before that period arrives, they will not only be deficient in strength at the critical moment, but also be destitute of a sufficient supply of milk for the support of the lamb, and consequently both the dam and her progeny must be greatly weakened, if

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*The most prolific sort is the *Tees Water* variety of the Lincolnshire breed, of which Mr. Culley has given the following instances. An ewe belonging to a Mr. Eddison, when two years old,

In 1772,	brought him four lambs,
In 1773,	five lambs,
In 1774,	two lambs,
In 1775,	five lambs,
In 1776,	two lambs,
In 1777,	two lambs;

and of these the first *nine* lambs were yeaned in *eleven* months. But such instances are of very rare occurrence, and deserve notice rather as being curious deviations from the usual course of nature, than as affording any real ground for calculation.

According to Mr. Teissier's experiments on gestation, (already alluded to in the previous books,) out of 912 ewes,

140	lambed between the 146th and 150th day; mean term	148
676	150th and 154th day;	152
96	154th and 161st day;	157

The extreme interval being 15 days to a mean duration of 152.

*It is commonly, but erroneously supposed that the Dorset ewes bring forth lambs twice a year; such instances have occurred, but they are rare.

they do not actually perish from such mismanagement.

As the time of yeaning approaches, the attention and assiduity of the shepherd ought proportionably to increase, as it sometimes becomes necessary to assist nature in cases of difficult parturition; and also, if in the open air, to drive away crows and similar birds of prey, which might otherwise assault the newly dropped lambs, and pick out their eyes, notwithstanding all the efforts of the dam.

As soon, therefore, as the ewes are expected to begin to yean, they ought to be separated from the rest of the flock, and placed in a more sheltered paddock, or in a spacious standing littered fold, on one side of which should be a warm cottage hut, provided with a chimney, and with a stove for warming milk, and also with a bed on which the shepherd may lie down. Here he is to sleep during the lambing season, that he may be ready to watch, assist, and tend any ewes which he observes to be very near lambing, and, if necessary, to give aid to the young animal. Some farmers have such huts on four wheels, to draw about with the flock wherever they may be, and on extensive downs that is an excellent plan; but on farms of a moderate size, it is a far preferable method to have one or two well-sheltered inclosures, to which the flock may be taken without any distant driving: for, although the fold may be useful in very exposed situations and inclement seasons, yet the practice of folding ewes at lambing time is generally objectionable.

It has already been intimated, that turnips are of great service in giving a flush of milk to ewes, unless they have been weakened by difficult parturition, in which case it is considered rather prejudical than otherwise; and, as many drop their lambs at a very early period in the year, great care is necessary in supplying them with these useful roots, so as to insure a sufficient quantity. If the land be wet and liable to be poached, the best mode is to draw the turnips, and cart them to a dry pasture, where the sheep may be baited with them once or twice in the day; proper attention being bestowed that they eat the whole, without committing any waste; which, if duly observed, will afford a certain criterion of the quantity necessary for each bait, while the stock of roots will be consumed in the most benefical and economical manner. On dry lands, indeed, a different practice may, with advantage, be adopted, by eating the crop on the land, hurdling off a certain quantity for the flock; and, as they consume these, by extending the hurdles further. By this method, no considerable degree of trouble is occasioned; and, it is preferable to that of allowing the sheep to run over the whole field, by which the roots are never eaten off so clean as when the flock is confined to a small quantity at one time.

During very wet or stormy weather, or in deep snows, it will be necessary to bait the ewes on hay. With some farmers it is usual to drive them to hay-stacks, where they meet both with shelter and with food; a measure which is by no means consistent with the economy that ought to exist in every department of farming business, in the manner in which it is commonly practised, but which might be rendered in all respects expedient, by merely fencing the stack round with hurdles, and distributing the hay from it daily. When placed in the centre of a standing fold, a square stack forms an excellent defence for a small flock, against bleak winds, as they have quite sufficient sagacity to seek its leeward side. By others, again, the hay is given in moveable racks, and a stated portion *per day* is allowed. This is an excellent method while on turnips, let the weather be good or bad, for it corrects the watery quality of the food; and sheep thus fed are found to thrive better than upon either hay or turnips alone. In some parts of the kingdom, the most experienced farmers give their ewes and lambs bran and oats, or oil-cake, in troughs, while they are feeding on turnips; but the expense attendant on this practice can only be repaid by a superior breed.

By the course of feeding here detailed, the sheep may be successfully supported till the month of March, about which time the stock of turnips upon the land is generally consumed; so that every attention should be paid to have a proper supply of spring food. Among the many expedients resorted to for this purpose, may be mentioned the turning of sheep into a spot of rye sown for the purpose, or into crops of wheat, in order to feed them off; a practice which, however, is necessarily confined to arable farms, and can seldom be carried to a sufficent extent. Other resources are the letting the animals run over the clover and pasture of the farm; hence the crops of hay, and pastures for large cattle, receive material injury. Others have an adequate spot of land, under ray grass and clover, ready to take the ewes and lambs from turnips, before they are turned in upon the pastures. The last mentioned practice is undoubtedly the best; but it may be materially assisted by removing *Swedish turnips* from the ground and stacking them upon layers of straw, after having cut off the tops and roots: the common turnip will become sticky; but Swedes, treated in this manner, will retain their nutritive quality until towards summer, and will be found essentially serviceable at this trying season. *Turnip, cabbages*, the *ruta baga, green borecole*, and especially *burnet;* all afford singularly useful crops for spring feed. The latter has the peculiar property of maintaining its verdure throughout the winter: so that, even under deep snows, some luxuriance of vegetation may be discovered. In November, it should be four or five inches high: and, by February, the crop will gain two or three inches in growth in the young leaves, when it will be ready for sheep.

Infinitely preferable, however, to any of these useful articles of late spring feed for ewes and lambs, is *rowen*, or the aftergrass, kept on dry meadows and pastures after the hay-harvest is concluded. Although a field of rowen presents an unpromising aspect at a distance, in color not unlike very bad hay, yet when this covering is removed, a fine green herbage, from five to six inches in height, will appear; the whole of which is eaten with avidity by the ewes and their young progeny, who are thus supported till they are turned into the pasture, and being a sure resource, while others may fail, should never be neglected.*

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*Mr. Young gives it as his opinion, that rowen is the cheapest mode of keeping a full stock in April. If of a tolerable quality, he estimates that it will carry ten ewes on an acre, *together* with their lambs, through the whole of April; and computes its relative value to be, With regard to the best time for *weaning* lambs, much depends upon the period, or season, when they were yeaned. When a lamb is to be kept for breed in a good common pasture, it is the practice in some counties to wean it at the end of about four months, in order that it may become strong, and that the ewe may acquire strength and go quickly to blossom. In others, which are more mountainous and poor, the lambs are weaned a month earlier. But whatever influence local customs may have in this respect, this business should be performed before the expiration of July; and, as it is of essential importance to their future growth, and consequently to the breeder's profit, that due provision be previously made, it will be proper to remove the lambs to a distance from the ewes, to such fresh food as may be most convenient. Clover, while in blossom, is the most forcing food; sainfoin rowen may also be successfully employed for the same purpose; but nothing is superior to a sweet bite of fresh pasture-grass. On weaning the young animals, their dams may be milked two or three times, in order to relieve their udders, which would otherwise become painful.

When lambs have been once stinted in their growth, either by disease or insufficient food, they become what is technically termed *sticky;* after which, although they may be in apparent health, it is out of the power of art to fatten them. It is, therefore, of the utmost importance both that the ewes should have abundant food, in order to produce a flow of nutritious milk while they are suckling; and also that the lambs should have plenty of good pasture, or of other succulent green meat when they are weaned.

Various ages are mentioned as being most proper for *gelding* those lambs which are not intended to be raised as rams for breeding; but the sooner this operation is performed, the better it is for the animal, which is more able to support it while young, and running with the dam, and when there is less danger to be apprehended from inflammation. The time best calculated for this purpose, in the opinion of the most experienced farmers and breeders, is within the first fortnight, unless the lambs are unusually weak, in which case it will be advisable to defer castration for two or three weeks, or such longer term as may be expedient, till they acquire sufficient strength.

In grazing farms, in general, it is not only of great importance to dispose, at certain times, of such beasts as either become unprofitable, or are sufficiently fat for sale, but also to separate the stock and place them in different pastures, according to their age and condition. In the southern counties of this island, the severing of sheep usually takes place about six, eight, or ten weeks after the shearing is finished, or in the course of the middle of August. In making this selection great care should be taken to choose those only which give indications of their being of the true breed (whatever that may be;) and, according to their comparative strength or weakness, to regulate their pastures. Hence it will be proper to place those animals which are designed for breeding or fattening by themselves: the ewes by themselves; the *wedder* or *wether hogs,* (i. e. males, whether castrated or not, that are of one year's growth,) and *theaves*, or females, that are two years old, by themselves; and the old wethers and rams by themselves; and lastly, the lambs by themselves; otherwise the stronger animals will injure such as are weak, and prevent them from taking that food which would be most beneficial for them.

When a farm is thus stocked with a proper assortment of sheep, it will be necessary for the owner to inspect them often, particularly in the winter; and, either to remove into better feed, or to dispose of those which do not thrive upon their allotted grounds; but, independently of these examinations, the shepherd ought constantly to continue with his charge, as they are liable to various maladies, which, if not speedily attended to, will carry them off in a very short time.

Before we close the present discussion respecting the management of sheep, it may not be improper to advert to one or two practices materially connected with them. The first is that of *docking*, or cutting their tails; which prevails not only in this country, but likewise in Spain, Saxony, and, generally speaking, in every district where the inhabitants pay much regard to the improvement of wool-bearing animals. The tails are usually cut when the lambs are three or four months old; for, if the operation were deferred beyond that time, it could not be performed with safety to the animal. This practice is objected to by some intelligent breeders in England, on the ground that it renders sheep unable to defend themselves against the attacks of flies during hot seasons: by others, however, it is strongly recommended, because it tends to preserve the health of the animals, by keeping them more clean from the odor which they, in a great measure, deposite on the fleece, and gives the animal a square, handsome appearance on the hind quarter. It is very generally adopted, except by some breeders in exposed situations, who, not unjustly, conceive that the long bushy tail affords considerable protection and warmth to the udder of the ewes in very severe weather.

The other practice above alluded to is, that of *extirpating the horns of sheep;* which has hitherto, we believe, been confined to the sheep-walks of Spain, and to the sheep-farm at Rambouillet, in France. The reasons assigned for it, and the manner in which this operation is performed, are detailed by M. Lasteyrie,* but we deem it unnecessary to insert them, as the practice is not likely to be adopted in this country.

In fine throughout the whole system of sheep husbandry, the greatest attention is necessary, on the part of the *shepherd,* regularly and frequently to inspect the animals committed to his charge. From the nature of his employment, which is usually exercised at a distance from his master's eye, he is under but little control; the property in his care is generally valuable, and always requires the closest attention; the greatest circumspection is therefore necessary in choosing an experienced and trustworthy person for the office; but when such an one is found, his services should not be grudgingly remunerated. In Saxony the shepherds have not fixed wages, but are allowed a pro-

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in autumn 10s. or 12s.: in spring from 30s. to 40s. per acre; and, if the season be backward, that a farmer who possesses it would not be induced to dispose of it for a more considerable sum.

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* Histoire de l'Introduction des laines fines, &c. p. 236.

fit on the produce of the flock. From the adoption of this arrangement, the sheep-masters derive great advantage, as the shepherds have no inducement to deceive them, and are themselves interested in taking due care of the animals committed to their charge. This practice has also been adopted by some large flock-masters in Scotland with great success: how far it may be feasible in England it would be rash in us to assert; but as the hint seems worthy of attention and trial, we leave it to the consideration of the intelligent reader.

The *Shepherd's Dog* performs so important a part in the management of sheep, that some notice of his qualities cannot be deemed irrelevant to the subject. The species which is delineated in this work occurs chiefly in the extensive sheep-walks in the northern parts of this island, where the purity of its breed appears to be preserved in the greatest perfection. Its docility and sagacity, indeed, surpass those of every other variety of the canine race: obedient to the voice, looks, and gestures of his master, he quickly perceives his commands, and instantly executes them. A well-trained dog of this kind is, to a shepherd, an invaluable acquisition. The faithful animal anxiously watches the flock, keeps them together in the pasture, from one part of which it conducts them to another; and, if the sheep are driven to any distance, he will infallibly confine them within the road, and, at the same time, prevent any strange sheep from mingling with them.

In Prussia, there is a peculiar breed of dogs employed in the management of sheep: it is described by M. Lasteyrie as being of a small size, but stout and thick, with erect ears, and bearing some resemblance to our wolf-dogs: their coats are partly smooth and lose, while others are long and shaggy. They are remarkably docile; *never bite the sheep;* and at their masters' voice, repair instantly to that part of the flock which is pointed out: in case the sheep hang behind, *these dogs push them forward with their muzzles;* which is sufficient to make the sheep take the requisite direction. An importation of a few of this breed would certainly be worth the trial: or if the Prussian mode of teaching our dogs not to bite, could be acquired, it would be a most desirable object. The continual state of fear in which those naturally timid animals are kept by a dog that has not been properly trained, disturbs their repose, and prevents them from feeding quietly; and, in fact, it rarely happens in any flock, that there are not some sheep which are from time to time lacerated, more or less severely, by the bite of dogs.

From the Genesee Farmer.

ROTATION OF CROPS.

I have ever considered the notion which has been advanced in some of the English agricultural journals, that the matter thrown off in the soil by a species of plants is poisonous to other plants of the same kind, if grown in succession, as most unphilosophical, and contrary to fact. Some of the advocates of a doctrine of an absolute necessity in all cases for a rotation of crops, found in this supposition of excrementitious poison, a very convenient argument for their system, and hence it has obtained some currency both at home and in this country. Farmers, however, of all men, should be the last to be wedded to theory, as theirs is a profession eminently practical. It is too late in the day to "doubt" that the system of rotation in crops, under proper circumstances, is of the first importance in agriculture. Its effect, however, does not depend on the extinction of excrementitious poison, but by a renewal of the proper food of plants. That the influence of rotation has been overrated by some English and American theorists will not be disputed, and when the time comes to underrate, of which some symptoms can be discerned already, it is at least probable it will be as injudiciously decried. That corn will grow in succession for half a century on the Genesee flats—wheat for thirty years on some of the favored wheat lands of West New York—and oats for twenty years on some of the slaty soils of Cattaraugus, without much diminution of quantity, I can readily believe; but exceptions like these to the system of rotation only demonstrate the propriety of the course in general. To us it appears the doctrine of rotation is founded on very simple principles, capable of easy and successful application, and hardly leaving room for doubt or disputation. That plants during their growth do take up, and appropriate as nourishment, very different materials from the same soil, will not be questioned by any one who has paid the least attention to vegetable physiology. For instance, does the pine apple or the orange take as much silex from the earth as the bamboo or the rattan, some of the species of which have an outer covering so hard as to strike fire when struck together?—or, to select a more familiar example, does the Faden contain as much of the salt called potash as the elm or beech?—and how does it happen that while 1000 pounds of wormwood yields 784 lbs. of saline matter, the box and the aspen produce but 70? This faculty of taking up particular substances as food, and the necessity of the supply, holds good in the cereal grasses, such as wheat, rye, barley; in corn and oats; in roots, such as potatoes, carrots, turnips, beets, &c. They all find and assimilate as nourishment different ingredients from the same soil, or appropriate them in very different proportions. If the soil of my farm abounds in those aliments essential to the production of wheat, I can raise crop after crop from the same land, and rotation is needless; and this course of successive crops will be successful in exact ratio to the continued supply of proper food. If, however, the proper food of the wheat plant is limited, a rotation of crops, and manuring, by which this quality can be restored, is indispensible. It is so with corn, oats, and most other plants. The rich alluvion of the Genesee flats is apparently inexhaustible by corn; perhaps 90 parts in 100 are suited to the growth of that important article; but this fact does not prove that other and less favored soils cannot be exhausted, or will not be benefited by a rotation. I have seen some of the oat lands spoken of by Mr. Allen in a former number of the Farmer, and feel a pleasure in bearing testimony to the general correctness of his views, and justness of his remarks; yet the facts he has stated furnish perhaps one of the strongest arguments in proof that different plants take up different materials from the same soil, and therefore that rotation must, in most cases, be advantageous. Those lands in the southern tier of counties of which Mr. Allen has spoken, as producing such abundant crops of grass and oats, are, it is well known, worthless for wheat, the flour of the little they do produce being of a very inferior quality, and no more resembling that of the counties bordering on the lakes, than does the rye flour of the eastern states. I should put but little confidence in the theoretical notions of any man, who could imagine that the farming of a whole country can be made to conform to a single system, or pattern. There is an almost infinite variety in the original ingredients of our soils and their proportions, and the mode of treatment, to be judicious, should be as near as possible made to conform to these variations. There are some general principles every where applicable, and there are others which have but few exceptions; of the latter class I consider to be the doctrine of the utility of rotation in crops. My friends, the practical as well as theoretical Ulmus, or the "doubting" R. M. W., may be so fortunate as to possess farms which will admit of an unbroken succession of wheat crops, but I imagine the farmers of Old Onondaga will in general agree with me, that the simple rotation of wheat and clover has more enhanced the productiveness of their farms, and consequently rendered them more profitable and valuable, than would successive but necessarily diminished crops of that valuable grain, and important staple of our country.

W. G.

From the Farmer and Gardener.

RIBBON GRASS.

I wish to make a few remarks on some experiments that I am making, though now in their infancy, on a species of grass here named and known as the ribbon grass. This early disclosure of results, as far as they have gone, is rendered the more necessary, inasmuch as I have recently seen an extract from a letter of mine in an agricultural paper which though not intended for the public eye, found its way to the press. To this course I have not the slightest objection; but on the contrary, will feel especially happy at all times, if what I may say should be of service to my countrymen, of letting whatever I may write be published. The circumstance to which I allude was this. I mentioned in a letter to a friend, that I had seen a patch of ribbon grass, in a very flourishing state on a wet, boggy spot of ground, and of my full belief of its being susceptible of being very extensively and profitably cultivated, and of my intention of trying the experiment. As this has been communicated to the public, and as I have had a very favorable account of it from a gentleman in Connecticut, an experienced and practical farmer, and of his determination of entering into its culture immediately, I deem it proper that I should make known my own experiments and opinion of this grass, believing as I do that it will prove a most valuable acquisition to the cultivated grasses, and a great blessing to the people of the south in particular.

A neighbor of mine, (Capt. John Simpson, living in Greenland,) knowing I had made some experiments on grasses, observed to me that he had a patch of ribbon grass on a springy, boggy piece of ground, which it was worth my while to see. It was his belief, from its luxuriant growth in the *bog*, and the circumstance of its expelling all other grasses, taking full possession of the soil, and affording two full crops in the season, and from the fact *that all kinds of stock were very fond of it, that it might be cultivated to great advantage.* This excited my curiosity, and I soon called on the gentleman to satisfy it, and was surprised at the beauty and richness of the grass. It grew on a bog at a small distance from a living spring, where the water descended and spread through the grass all the season. The appearance of the neighboring grass in the same situation, was very ordinary, being thin, flat-leafed, short, and nearly worthless—whereas the ribbon grass, in every particular, wore the most beautiful appearance of any grass I had ever beheld. It was then in its vigor, and in full bloom, every leaf being expanded, wide and thick, so that the eye could not penetrate through it. Each leaf has one or more stripes lengthwise, differing, on close scrutiny, from each other, either in the number of stripes, or their form or shade. This grass averaged about four feet in height, and stood perfectly erect. It is possessed of a fine solid stock, having an inviting and luscious appearance as fodder. I took a clean lock of it, and another of herds grass, and offered them both together to my horse, and found him quite as fond of the ribbon as of the herds grass.* Capt. Simpson states that he has observed that his stock were more fond of it than of his best hay of other kinds. This patch would amount to about one square rod.

I engaged the seed, not knowing what it produced, having never particularly observed the grass before; I accordingly applied at the proper time as was supposed, and reaped the heads, but was able to discover but very few seeds, from one to three to the head. Being certain that we were full early, a part was suffered to remain till later in the season—when by a re-examination it was found in the same condition. I beat and rubbed out the chaff; but could discover only a few small seeds. I sowed it in good season, with the greatest care, in my garden, hoping that in the chaff, there was more than what I could discover, which would vegetate. I sowed it in drills, to be sure to have it well covered, and that I should not mistake other grasses for it. There appeared to come up a few white blades, which I supposed to be young ribbon grass; these few, however, dwindled off one by one, till all disappeared, the ground never having been disturbed since, and I have not one plant to show from these seeds. Hence I conclude it *cannot be propagated from the seed.*

Having a very favorable opinion of the grass, I looked for some way to propagate it, and concluding that it might be multiplied from the *root*, as hops and many vegetables are, I accordingly engaged one-half of the patch, to take it in the spring. I prepared my ground (40 rods) by ploughing in my low ground in the fall, the ground varying from soft to very soft mud. The spring being wet, the ground uncommonly soft and muddy, I postponed the setting of it out, I think, till June, when I went for my wagon load of turf, the grass

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* Mr. Robinson means timothy, that being the name by which it is designated to the eastward.—Ed. Far. and Gard.

was then from four to eight inches long. Early in the spring it had had a dead appearance, but at this time it had become pretty well sprung up; some old stubs were dead. Perhaps this situation was one of the most trying of any to be found. It grew where ice made to a great thickness from the water spraying from the spring all the year. Mr. Simpson has informed me since I took away one-half of his turf of the ribbon grass, that it sprung immediately up in the same place, and produced a crop quite as good as before. Since his closer observations, he says he esteems the grass more highly than at first.

The manner in which this grass was planted in the bog, was this. He had a tuft of it growing for ornament in his garden, in a very rich soil; which he occasionally ploughed, and finding the ribbon grass spread a little too far, he ploughed off some of the roots, gathered them and threw them into the bog; he found they took root, spread and flourished as I have stated. I observed when getting my grass, there were some low spots covered with water, where the grass sprung up stronger and larger, being apparently more in its element.—Capt. Simpson's garden is of the richest soil among us; yet it is evident that one rod of the bog will produce as much as four in his garden. Immediately after getting home with my turf, I commenced chopping it up, taking care to divide the tufts according to the stalks, leaving from one to three in each piece, choppig them with a sharp spade, into pieces, from one to four inches square, setting out about 40 square rods, about two feet apart, without any manure; and setting a few for experiments in the middle furrow where the water was constantly issuing nearly all the season. None of them failed of living, and all have taken root, shot out and spread considerably; some few to meet each other. Those in a dead furrow appear every way as thrifty as those on the bed. I had the curiosity to try the experiment by sticking one stock of this grass without root in the mud, where the water continued to issue: it appeared to grow as well as those with the root; and shot out with branches. This method of propagation is more facile than from the root. I pressed several tufts into holes in a bog where the water would rise to the top of the tufs, (this is among fresh grass,) here it shot out and appears in its element, and will in all probability spread and drive away all the other grasses. I also sunk some into what is called a quagmire, where it is so soft as not to bear a cat; here I sunk the tufs level with the water; these have the appearance of being perfectly in their element. All these I have lately surveyed since our severe cold, and those in the wettest places appear least effected. I set some of them out on some of the most barren soil, under a forest of white oaks, where nothing of consequence will grow: they all live there, and will probably produce something, perhaps one ton to the acre; if it will do this on very barren lands, it may be well to cover them over with it. I have set it in my front yard and in my garden, on warm soil of tolerable quality, bordering on common grass, in part for ornament. A portion of this was manured and hoed; here it is perceivable that the higher the culture the greater the product as it respects high ground. It is demonstrated from my experiments, and Capt. Simpson's discovery, that this grass is truly amphibious. It will do well on high dry lands, and it will thrive in a bog or even in water. I do not know how deep a water it will grow in, but I presume it will grow in shoal, especially running water. Is it not evident that this grass possesses very valuable properties, and must prove superior to most other grasses?—Yes, for it not only grows luxuriantly and in abundance in a quagmire where nothing of any value has ever been known to be produced before, but its roots are of such a tough nature, that a sward is soon produced that will bear a cart and oxen to pass over it. It has another good quality:—although the circumstance of this grass not producing seed for propagation, seems at first view to lessen its value—yet when we consider the evils resulting from many troublesome grasses that spread from seed, and that no limits can beset them; we may, with propriety, esteem it a virtue in this fast-rooted grass, that limits, can be set to it, that our valuable tillage ground may never be impeded with its roots, and that our waste and unproductive bogs may be easily changed to the most productive portions of our farms. As to what *Ribbon Grass* will do in pasture, I know nothing. I have my doubts whether it will succeed, as I think it is not thick and downy enough, to bear repeated trampling and cropping close to the ground. It is possible, however, from its hardiness, wherever it has been known by me, that it may endure the hardship of being pastured; if so, I have a right to conclude from all its other properties, that it will prove far more valuable than any species of grass yet introduced into culture (the gama not being fully known,) and if any farmers at the North or South, have waste bogs that are eye-sores within their enclosures, let them try the experiment of the culture of this grass: it will not be costly, even if they should not succeed.

ABEDNEGO ROBINSON,

Of Portsmouth, N. H.

From N. Y. Jour. of Com.

MOWING MACHINE.

We have seen at the shop of Mr. Johnson, in Cherry Street, a mowing machine, which we are told is the first of the kind built in this country. The cutting operation is performed by circular knives fastened upon the periphery of a horizontal wheel five feet in diameter. This wheel is suspended upon a perpendicular iron shaft, which hangs upon a lever, by which the knives are raised or lowered at the pleasure of the driver to suit any unevenness in the ground. The motion is given by geering, connected with the wheels, on which the whole machine rests. The machine will weigh a ton, and is moved by two horses. Upon the horizontal wheel, and just within the edge of the knives a tub of light wood, which has the effect of carrying the mown grass into a swath. We see not but that the thing will work well on smooth land, but where there are rocks of much unevenness it cannot. It is said to be capable of mowing ten acres a day, and certainly, for the mower, it is much easier to ride on this machine, than to swing a common scythe. The machine was invented in England, but the laborers there, probably under the guide of some philanthropic leader, made war upon it, and would never permit it to be used in peace.

IMPROVEMENTS BY MARLING IN NORTH CAROLINA.

To the Editor of the Farmers' Register.

Newbern, June 22, 1835.

DEAR SIR—I have lately received from Mr. Benners the enclosed letter, and supposing it to possess some interest for you, I have accordingly forwarded it. I should be pleased to send you some of Mr. Benners' specimens, if an opportunity of forwarding them should be found. Mr. B's position, you may remember, is on the northern bank of the Neuse River, about 16 miles below Newbern. He is the only person in this section of country who has any considerable experience in marling. A few other persons however have begun to make experiments.

Yours respectfully,

H. B. CROOM.

P. S. The marl pits of Mr. Benners are remarkably interesting for the variety of shells and fossil bones which they afford. These have proved, in the estimation of Mr. Conrad, the existence here of the *newer pliocene* formation.—See *Silliman's Journal* for April, 1835.

TO H. B. CROOM, ESQ.

Roseville, June 14, 1835.

Dear Sir—In reading the Essay on Calcareous Manures, I learn for the first time, that our shell marl is *not* what is properly understood by marl in English books and practice. The solution of the two kinds is widely different. The test of marl is pure water—and acids the test *we* use for the same purpose. Observing this fact, I immediately recognised an old acquaintance overlooked and neglected by me, as I only *knew* him by the name of *clay*, but since his introduction to my notice under his *proper name*, I have made it my business to become more intimate with his character and *calling*, and find upon investigation, that marl is his *real name*. Brick mortar has certainly done him great injustice, both here and in England, in assuming the garb, quality, and character of marl —to the great loss and detriment of society in general, and farmers in particular. At the same time begging pardon for our past neglect of him, and promising every attention to him in future, we remain his humble servant. About ten years past, I did offer this marl a glass of vinegar, but having refused it, I cut and broke off all farther acquaintance, until latterly, I have fortunately discovered he is a pure water drinker. It is also remarked, that he is none the worse for his temperate habits. Nos. 1 and 2 are samples of this marl. I am now enabled to give you an account of the position and order of the different kinds of marl as they come to view in working the pits.

The first bed is a fat blue or red clay marl. Nos. 1 and 2, from two to five feet below the surface, and from three to seventeen feet thick.

The second bed under this, rich red or yellow shell marl, from one to five or six feet thick—effervesces in acids.

The third bed is a very *deep blue* marl, without shells, with here and there the impression of the whole exterior surface of the shell, forming a cell in which is a lump of marl the size and shape of the *fish*. This kind is very tough to cut up, but when dry, crumbles to a very fine powder, as light as ashes, and about the same color—effervesces in acids. Specimens No. 3.

The fourth bed is (either) a blue or white shell marl, and works like coarse mortar, hardens in lumps as it dries, but crumbles in moving about—effervesces in acids. This last or lower bed is from three to five feet below common tide-water, and has never been worked through. I have selected from the different beds of shell marl, a variety of specimens which I intend sending to you very shortly, and some fossil bones, &c. I am at present working a pit which exhibits the different strata, in the order in which I have attempted to describe them above, but very imperfectly.

It is very easy to be deceived in the strength of marl by merely handling it, or by the eye, as I have experienced the injurious effects of a too liberal application of it on an impoverished soil. Fifteen years ago, I *burned up* a piece of an old field by laying on too great a quantity of shell marl at the first dressing: but it is now excellent land. As this was my first experiment, (1818) I was mortified and disappointed, and was of course laughed at and ridiculed, because the experiment had fulfilled the prediction of those who merely guessed at what they knew nothing about. I soon discovered my mistake by observing that where the heaps were left unspread, and ploughed through and planted, that the young corn died, and that no grass would grow on the pure marl—but this was not the case in the intervals between the heaps; these spaces showed evident improvement, but so very gradual, as to be unobserved by every one but myself, and the hands employed on the farm. I soon perceived that my land was getting better. My means were extremely limited, and of course my land improved in proportion, and continues so to do up to the present moment. I very soon discovered that manure went a great deal farther on my marled land, than on land of a better quality not marled. The improvement, however, became at length too evident to all to be any longer doubted; but the *jest* continued, and the whole improvement placed to the credit of the manure, of which I have never raised as much as would afford a tolerable dressing to half of my corn crop, without the marl, and both combined with enclosing and alternate cropping; corn, cotton, potatoes, and wheat or rye: * the land divided in two equal parts, and one-half tended as above described, while the other half remains enclosed. This is the course I have pursued steadily for the last fifteen years, and have no disposition to change it for a better, unless our climate was more congenial to the cultivation of artificial grasses. White clover grows in my fields, but receives no assistance from cultivation—it dies in July and August, while the crop grass and carrot weed cover the land, and are invaluable, being capable of resisting the dryest and hottest weather.

*Rye should succeed corn and potatoes on all our light lands, instead of wheat. It is a most profitable grain for stock, and the quality and texture of our high lands are admirably adapted to the production of this grain, as a very profitable crop. My attempts at a good crop of rye have never failed—wheat on the other hand is just as uncertain.—L. B.

Whether land is sour or sweet, I am not chemist enough to determine: but I *do know* that the red sorrel will *not* grow on marled lands, as I have had a very fair opportunity of being abundantly satisfied. The whole of my land was covered formerly *knee deep* with a most luxuriant growth of this beautiful plant. At this time there is none to be seen, nor for the last eight or ten years.

With great respect,
I remain, dear sir,
Your obedient servant,
L. BENNERS.

[We learn from the foregoing letter what we had no idea of before, that Mr. Benners' experience of the use of marl commenced as long ago as 1818—the same year of our own first effort to profit by this mode of improvement. That the benefit of marling should have been so long exhibited, in a region eminently fitted to reap its richest rewards, without inducing others to follow the example, and *scarcely* to believe in the results, are facts both strange and lamentable. Nothing can place in a stronger point of view, the former and existing want of intercourse and exchange of opinions among farmers, and of the vast importance of agricultural periodical publications, as a means of remedy.

Mr. Benners seems to have placed an erroneous construction on a part of the work which he refers to, and which it would be improper here to pass without notice. In stating and proving at length that English farmers and writers have very often called *marl* what was merely *clay*, but slightly if at all calcareous, the author did not mean to contend for the correctness of the application of the term—but directly the reverse: and he would neither attach the name of marl, or consider of much value as manure, any *clay* which was not calcareous.]

LOW PRICED AGRICULTURAL PUBLICATIONS. EXTENSION OF THE PLAN OF THE FARMERS' REGISTER.

Low priced newspapers, and other periodical publications, are now so common, and so little regard is paid by the majority of readers to the considerations which ought to recommend more costly works, that some concession must be made to the prevailing opinions, in this respect, to be enabled to spread any publication very widely. Especially does this apply to agricultural publications among the middle class of farmers, by far the most numerous and important class, both as farmers and as citizens, and therefore the most desirable to attract and retain as readers and subscribers. Unless the main ingredient of a publication consists of party politics—the exciting and maddening intellectual food of thousands to whom every other kind is insipid, or repulsive—scarcely any periodical at $5 a year can now obtain very general circulation in the southern and western states.

It is unnecessary to state here, the various causes of expense which serve to add to the price of a periodical published in the manner, and form of the Farmers' Register—or to show, as might easily be done, that for its cost to the publisher, its style of execution, and for the amount and value of its contents, that it is truly a cheap work. This is so well understood by the greater number of those who are its present supporters, that they would not choose to have its form changed, and to yield the peculiar advantages of its present plan, for any consequent abatement of price. Neither is it our wish or intention, to lessen the value or the beauty and convenient form of the present publication—but on the contrary, to continue (as has been commenced already) to give increased cost and value to the material, and mechanical execution, and to as great extent as the object requires, and the means may authorise. But while carefully guarding against impairing the value, or lowering the grade of the Farmers' Register, as now published, it is highly desirable to suit the wishes, and gain the support, of the very many farmers of Virginia, and adjoining states, who have not yet learned the value of agricultural periodicals, and who will not profit by them, except when conforming to their general and commendable (though in this respect mistaken) views of economy. However extensively and liberally this journal has been supported, it must be confessed that it has comparatively made but little progress among the middle class of proprietors. It is true, that some farmers whose poverty forbids their indulging in any useless expense, and who labor daily and assiduously for their maintenance, are among our subscribers—and we are proud to have their support, because the amount of expense to them, is equivalent to a very high estimate of the value of the work. But for every one such, whom we can boast of as a subscriber, there are perhaps fifty who are rich, or at least in the possession of competent fortunes, who have withheld their aid, and that on account of the expense of the subscription. Without stopping to oppose the soundness of this objection, it will be admitted that it exists, and operates extensively—and every friend of this journal, and to the cause which it is designed to support, will admit the high importance of removing this obstacle to its circulation, and of gaining access, if possible, to a far more extensive body of readers.

With this view, a low priced publication is proposed, consisting of a single sheet, to issue four times a month, and to contain nearly the same matter as the monthly publication. But getting rid of the cost of the difference in the value of paper and of execution, and of the entire cost of various other matters peculiar to book work, and to the mode of delivery of our present publication, the work in the cheaper form may be furnished at little more than half the present price, and yet yield as much profit upon the same amount of annual receipts. Or in other words, 3000 subscribers at the rate of $2.50 would yield nearly as much profit, as 1500 at $5. The vast difference of benefit to the general interests of agriculture, which will be caused by the greater number of subscribers, is a sufficient inducement for us to risk the possible contingency of loss from a smaller accession of names, and of course a proportional diminution, in future, of the present amount of receipts. A specimen sheet and proposals will be issued, and the publication commenced as soon as there appears sufficient indications that a publication on this plan will be approved and sustained by the agricultural community: and if it is well sustained, there shall be nothing spared or omitted to make the diffusion of agricultural knowledge through the southern states both as extensive and *as cheap* as possible.

CROPS IN BEDFORD. AGRICULTURAL PAPERS.

To the Editor of the Farmers' Register.

Lynchburg, June 19*th*, 1835.

* * * * I have just returned from the country, (my farm in Bedford, 22 miles above this) where I find a small portion of the wheat crop tolerable good, but the mass very inferior—and a large part of that on the corn ground not worth cutting, even if it escapes the rust. This failure is ascribed in some degree to the unfavorable winter, but mainly to the ravages of the Hessian fly. Many of our planters have wholly, or partially discontinued the culture of tobacco; and by attention to manure, clover, and plaster, and better ploughing, have improved their lands to a considerable extent: but the prospects of the wheat crop, connected with the present price of tobacco, will, I apprehend, produce much backsliding, and many of us be found again to have "returned to wallowing in the mire;" so that this seeming good—the high price of tobacco—may be to us a real evil. The rye, oats, and corn crops appear rather promising, and the frequent rains of late, have enabled the planters to pitch their crops of tobacco without difficulty.

In a late number of the Register, you remark that your subscription is confined chiefly to the low lands. Your locality, your level and sandy lands, your marl beds, your easy access to lime, and other circumstances, produce a greater difference between our situation and yours, than with the same elevation would exist in several degrees of latitude. From these circumstances, I had no idea of taking the Register until I read your Essay on Calcareous Manures; and I have no doubt many are deterred from even looking into it from the same causes. The price too being higher than many other publications, may have some effect. Sixty odd numbers of the Cultivator, and several of the American Farmer, and Genesee Farmer, are received at this post office. I state this, not by way of complaining, but in explanation: for it is my opinion, that every sensible farmer, whatever may be his latitude or longitude, elevation or depression, may read your Register and your Essay with manifest advantage. With my best wishes for the continued success of your useful endeavors, I am, &c.

MICAJAH DAVIS, JR.

[The foregoing letter (post marked June 24,) was not received until after the last No. was printed, or it would have appeared earlier.

It is gratifying to learn that however small may be the patronage of the Farmers' Register in Campbell, other agricultural papers are more welcome there. The subscribers who receive the Farmers' Register at Lynchburg are only twelve—and there have never been more, nor so many until recently. If the price of this journal is the *only* bar to its receiving more favor in the upper country, a proposal has been made for its removal, by a similar publication of low price. But if there are objections to the general character of the work, or to the manner in which it is conducted, they will still remain in full force. Let farmers generally be but impressed with the importance of reading and sustaining agricultural periodicals, and we are content that their support shall be given to the most deserving, even if our work should be surpassed by many others in merit, or in other claims to public favor and support. If the great object is effected, it is of but little importance (and none whatever to the public,) by what means, or by whose agency, the end is reached, and the benefit produced.]

CORRECTION—"VIN MUET," OR DUMB WINE.

To the Editor of the Farmers' Register.

Columbia, S. C. June 10, 1835.

I have read with pleasure your article on "the making of wine in the canton of Mareillac." I take the liberty of observing to you that one word "mutage," [p. 23, Vol. III.] seems not to have been understood by your translator, and there is nothing surprising in this; for the technical expressions of particular arts are not easily understood, and they are not found in dictionaries. It is to be hoped that the new dictionary that is announced as coming forth, after many years' labor by the French Academy, will contain this and all such terms, without which it will not be complete. The verb "muter," signifies "to render mute," or dumb, which is done to wine by sulphuring it. *Mutage*, therefore means sulphuring. There is in some places a wine made that is called "Vin Muet," literally "dumb wine." It is wine that has been fumigated to excess with sulphur, before fermentation has taken place, which chemical process is thereby prevented, and the wine remains sweet. It is called "mute" because the bubblings of the fermentation are not heard, and it actually makes no noise. This word then is not near as bad as most others which no etymology can clear up.

N. HERBEMONT.

[We thank our correspondent for this correction. He who is best qualified to offer such, will be most indulgent to the mistakes of this kind which require correction. The number of provincial expressions which are found in all agricultural writings, render translations from one language to another very difficult: and this difficulty may well be conceived by all readers who have noticed how many of the provincialisms in our own language are unintelligible. Neither the verb "muter', nor its derivative "*mutage*" can be found in either of five French dictionaries in our possession—among which is the old voluminous *Dictionaire de l'Académie, &c.* a modern abridgement of the same, which professes to give terms of science and art, and Rozier's *Cours Complet, &c.* one entire volume of which is occupied with definitions of technical and provincial terms.]

For the Farmers' Register.

THE SOILS AND AGRICULTURAL ADVANTAGES OF FLORIDA.—No. 2.

Plantation Wascissa, Florida, July 2, 1835.

The most prominent characteristics of the lands immediately bordering on the Atlantic in East Florida, were succinctly delineated in my last letter: and conformable to my self-assigned order of correspondence, I continue my observations on the remaining and extensive inland portion of the "eastern district."

The character, features, and growth of the land are singularly and abruptly changed, as we proceed westward from the ocean: the country becomes generally more interesting in landscape, and more diversified in soil and native production. The monotonous levels and eye-fatiguing flats of the low Atlantic marshes, are no longer, with their rank grassy plumage, and thirsty palmettoes, to be seen: dense and towering forests of every foliage, luxuriant over a rolling and picturesque country most verdant with herbage, and spotted like the variegated leopard, with abrupt and strange marks of richness and sterility, strike the observant traveller with surprise, not unmixed with the illusion of enchantment.

The river Saint John's, than which there can be no nobler stream, seems by nature intended as the marked and eternal division of this varying and diversified country. It rises amid the swamps of the Everglades in the far south, and with comparatively little deviation from a north course, it streams itself along for an hundred miles and upwards, receiving numerous tributaries, and rapidly becoming a wide, magnificent river. When reaching the site of the town of Jacksonville, some twenty miles from the sea, it gracefully rounds and empties its widened breadth almost due east, into the ocean. This river is singularly characterized, in addition to its unrivalled forest banks, by extensive eye reaches, and prospective scenes, in being the only river of magnitude in the southern states of America that, from its source to the parallel of its mouth, runs *northerly:* and still more is it notable, that with this course, it should run for nearly one hundred and twenty miles of its length directly *parallel* to the Atlantic, and only divided for that whole distance, from the oceanic waters, by a narrow strip of land some thirty miles in average breadth. It is indeed a great natural canal, singular in its position, and unsurpassed in magnitude; and one sighs in witnessing the unprofitable waste, and sluggish idleness of its magnificent waters. The curiosities of the Saint John's are likewise peculiar, and well worthy of sight. I would name the *Silver Spring*, so dazzling with its transparency and spangled carpet, and so enormous in its dimensions and vehemence: as also the *Golden Spring*, equally curious, though smaller, in its jewelled bowl, and pellucid waters: but above all is most remarkable the phenomena of sound to be here awakened: no where can

"Gamboling echo hold more boisterous court—"

than o'er the still expanse of this enchanting stream. The report of my rifle was reverberated with astounding loudness, and stammering reiteration, alternately from bank to bank (here five miles distant) in thirteen distinct successions, gradually diminishing in power, till

"Distance smothered softly the sound."

Crossing this fascinating river, as the line of our descriptive sketches, we leave in the east the Atlantic, with the lands delineated in my first letter, and we find on the west the forest of Alachua, now to be described.

The county of Alachua extending nearly from the western bank of the St. John's, to the gulf of Mexico, and between latitude 29 degrees and 31 degrees, as its average northern and southern boundaries embraces an immense body of rich and diversified lands, constituting it one of the largest and most valuable counties of the territory. It is as yet but thinly populated: the presence of the Seminole Indians, heretofore in sole and native possession of its wide extending hunting grounds, has prevented the settlement of white men. These ill-fated sons of the forest will however *"relinquish"* their original rights this winter, and remove to the "far west," there to await the sure advance of demoralizing civilization, and as surely, their *second* pilgrimage! Speculation and avarice have, notwithstanding the "red men," ere this found a limited "local habitation" within these Indian reserves, and from the exciting reports, the tide of emigration is now setting rapidly thither.

A great diversity of soil, as visibly marked by an infinite variety of growths, necessarily is to be found throughout so extensive a county. The most valuable is the dark chocolate soil, generally on tabular sites, but oftentimes over the rolling lands, indicated by a dense growth of sweet-gums, dogwood, and tulip tree, with an impenetrable undergrowth of gigantic grape vines, thickets of wild orange, and plum. This soil I have never had an opportunity of examining accurately. To the eye, touch and taste, it seems composed of a strong rank vegetable decomposition, coating the surface in black humid fibrous matter, and combined with a large portion of aluminous earth, containing lime or other salt in visible quantity, though not in a carbonate combination. These lands when first brought in tillage yield but indifferently well, being, in the language of the district farmers, "too luxuriant and fat, and produce only weed." Cotton, corn, and sugar, however, after two or three years' culture, produce amazingly, and continue their large returns as far as experience has yet gone. I have said that "lime is present, though not as a carbonate," in these soils. I may extend my remark, and doubt whether calcareous earth as carbonate of lime is to be found in any of our inland districts: they have undoubtedly lime in abundance, and in some places are based on rotten limestone; yet I am inclined to think we have the combination of the sulphate, instead of the carbonate—and most probably more of magnesia, than of lime. I hope however ere long to analyse these interesting formations, and place my knowledge beyond an hypothesis. My present conviction is partly formed, by the taste of the earth, and partly from the great luxuriance near these rich mulatto soils of towering pine trees! But to return. These rich soils are beyond doubt inexhaustible; and large tracts are now vacant, awaiting the test of culture. Some portions are lighter in color, showing the preponderance either of silicious or magnesian earth: but all are proverbial for fertility and strength. The attention of the scattered settlers has heretofore been devoted to grazing: and their extensive herds, well rounded in limbs, and accompanied with numerous young, afford substantial evidence of the profit of such occupation. Some few plantations have been opened, and are now successfully under cultivation of the sugar cane, sea island cotton, and farinaceous grain. Their crops have been variable in production: though their failures may justly be attributed to the deficiencies of the requisite machinery and dilatoriness in harvesting, rather than to any fixed discovered error of soil. Procrastination has been here, as well as in other parts of Florida, the thief of wealth. Col. Clinch of the army, is I believe, the proprietor of the largest settled estate in Alachua. His plantation has been in operation for several years, and though it has had, like others, its good and bad crops, it may be stated, (in evidence of what the soil and climate can produce,) that last year, notwithstanding the unexampled severity of the winter, he realized from his crop, unassisted by artificial manuring, and at best roughly cultivated, with only about fifty negroes, the sum of (as understood,) $20,000! having made (as heard,) 170 and odd hogsheads sugar, and 60 odd bales of fine sea island cotton, besides a large crop of corn and other provisions!

No other evidence is needed to establish the great fertility of the Alachua soil; or to show the immense returns capable of being there made from agricultural investment. What one man *has done*, a thousand equally skilful and industrious *may do*: and if any apology is due for the freedom with which I promulgate private emolument, I trust it may be found excusable, in the absence we have of *other* means of comparing the fertility and capabilities of this new country; as well as in my aim, that the speculative world may be attracted to an examination of this wealthy, yet vacant land. The advancement of the public weal augments the prosperity of individual interest; and upon this truism, I hope yet to see intrusive and prying science embowelling the concealed mines of Florida.

Alachua has, bestowed by nature, a liberal share of her best advantages. With an extent of latitude, embracing both a temperate and tropical clime; and affording a *choice* of navigation and intercourse, either direct to the gulf of Mexico, (of which it constitutes a part of its eastern boundary,) or through the tributaries of the St. John's River, to the Atlantic. With a soil rich beyond exhaustion, rich in perpetual pasturage, and valuable timber, and varied in texture and qualities; congenial to the production of almost every northern and southern staple of commerce. With open and commanding roadsteads, among which are notable Charlotte's Harbor and Tampa Bay, equally proverbial for good anchorage, accessibility, and uninterrupted health. All these are advantages singularly combined, and which must not only create rapid wealth and improvement, but ultimately rank the County of Alachua as the "*Jewelled Queen of Florida.*"

My next letter shall not be so prolix, and will be upon the Middle District.

FARQ. MACRAE.

For the Farmers' Register.

VEGETABLE AND ANIMAL ANALOGY.

[Continued from page 756, Vol. II.]

Observation teaches that nature has implanted appetites as various among vegetables, as we find in the animal kingdom, and hence arises that endless diversity of their qualities and properties. They are so differently organized, and had implanted in them originally, such various appetites, that every order and species of the two kingdoms may receive certain principles from the earth, which when combined in certain proportions, shall constitute the animal or vegetable; and although they may be equal in size, and similar in their general conformation, as to external appearances, and nourished by the same food, shall differ in strength, texture, and solidity. This, however, can only be explained upon the principle of a difference in organization; viz: a difference of capacity in their vessels, glands, &c., whereby certain portions of the same food are received, or rejected, according to the structure of those parts, or capacity for receiving suitable proportions of aliment. A plant extracts from its gross parent (the earth) those principles which are suited to its nature and constitution; the earth always ready to give, but the plant is not willing, and rarely receives any thing but what is proper for its subsistence: it is worthy of remark, that in soils most favorable for the production of the various mild esculent or nutritive plants, *nicotiana, cicuta, hyosiamus, digitalis, lauro cerasus, datura stramonium, monkshood*, &c., flourish and arrive at great perfection. There can be no doubt that the principles received from the earth, by those noxious plants which constitute their most virulent and active qualities, are not intimately blended with that which affords nourishment, and becomes a component part of all the nutritive tribe. Their organization, or the capacity of their absorbing vessels, are such as necessarily exclude those poisonous principles; and it seems that by virtue of an inherent or instinctive principle implanted in them by the author of their existence, those offensive matters are uniformly rejected. From this circumstance may we not infer, that both the animal and vegetable kingdoms possess the power of receiving food when it is offered them, and also the faculty of choosing. Animal and vegetable instinct may probably be admitted, since we cannot with greater propriety call that principle of a child by any other name, which prompts it to seek the breast of its mother, soon after it comes into the world; and that of aquatic fowls to seek water, as their natural element, soon as they are disengaged from the egg-shell; and that of a vine to rear its head to the highest places, and entwine every branch within its reach, as if mindful of the danger to which it must be exposed, if spread out promiscuously upon the earth. Many other circumstances relative to vegetables, would, at first view, seem to prove that they possess sensitive and instinctive qualities, not unlike those of animals.

The vegetable and animal kingdoms derive their support either directly or indirectly from the earth, through certain media. Many of the large vegetable seeds, when divided longitudinally, present an entire plant with its stalk and foliage complete in miniature, and nothing wanting but to be placed in reach of what it is destined to receive for its further developement. We may perceive at the same time, that this little germ has a partial connexion with the farinaceous matter which protects it, at this early state, from external injury, till, like the chick confined in its shell, which has exhausted the resources of its confinement, and arrived to that degree of maturity which enables it to sustain the impression of the earth and atmosphere, it bursts forth and seeks new acquisitions in the earth. It is probable that this germ is nourished, and thus far developed, by the channels of its connexion with the farinaceous matter which forms the body of the seed: yet from some experiments made with the bean, it seems that the germ, so far unfolded as we find it in the ripe seed, is not necessarily dependent on those channels through which it had previously received its nourishment, for a final germination in the earth. This farinaceous matter may be separated and removed without the least injury to the plant, and this too before it has rooted. On dividing the two tables of the bean longitudinally, we perceive the germ pretty firmly embraced by each of them, forming a sort of cylindrical mein or link of connexion, which is merely partial or temporary, for those two bodies, though lively and juicy at an early stage, wither and fall off at a certain period when the plant has put forth roots and leaves; which circumstance inclines me to be of opinion, that they serve some useful purpose in the way of assimilation or transmission of suitable juices for the nourishment of the germ—though this may also be rendered somewhat doubtful from the following experiment. The germ was carefully detached from the two tables of the bean, having previously provided a suitable space for its reception by hollowing each of them: this was done in such a manner as to free the entire germ from any degree of pressure that might be made on it by the two sides of the bean, when they were brought in contact—having bound them pretty firmly together and placed the whole in moist vegetable earth—on examination the third day, the germ had become so enlarged, as to put the bandage very much on the stretch. It was now removed from the tables of the bean and placed naked in a fine bed of earth which had been prepared for asparagus, where it soon rooted and flourished as an ordinary seed would have done in its natural state. Hence an inference may be drawn in favor of the opinion, which supposes the fœtus receives no nourishment by the umbilical cord. Nevertheless, I am well assured that the seed of vegetables as well as animals, receive their nourishment through the channels I have mentioned, during their attachment to the parent.

I am unable to conceive how nourishment can be conveyed to vegetables, if the mouths or extremities of those vessels which open on the surface of the roots, be quiescent. Capillary attraction above would hardly convey the necessary principles to the different parts of the vegetable. If it be not allowed that those vessels possess irritability and contractibility similar to those of animals, the whole process of vegetation must be performed mechanically. It must be explained upon the supposition, that a partial vacuum is formed in their vessels, or the fluids they contain become rarified, or less dense than those which are afforded by decomposition in the earth, and brought in contact with their rooty fibres; if this be the case, those fluids, according to the general laws of gravitation, must press forward and occupy the void spaces. But I think it much more probable that these vessels possess excitability or aptitude of motion, and perform their office similar to the lacteal and lymphatic vessels of animals—their food as it is offered by the earth, being in a similar state to that of animals as it is found in their digestive organs, where the mouths of the lacteal vessels are open to receive it for the nourishment of the general system.

There seems to be a remarkable similarity in many of the operations of nature, and it is this obvious analogy, discoverable in the astonishing works of creation, that gave rise to the opinion, that it is not more necessary for a continuous route of circulation to be kept up between the mother and fœtus, in order to produce its evolution, than that the earth should be considered organical, and continuous vessels form between it and vegetables at the time of their germination, for the purpose of conveying into them the various matters of which they are formed. A tree acquires from the earth its cortical and ligneous parts, without a placenta to assimilate, or an umbilical cord to convey to the general system; and is on a footing with an animal which is disengaged from its mother, and seeking food in the earth where it may be found. The general operation of nature, as it regards the production and nourishment of the two kingdoms, is decidedly analagous, with this difference, that animals receive their food somewhat refined and assimilated, while the vegetable kingdom extract it from the crude matters of the earth.

In order to pursue the analogy between animals and vegetables with perspicuity, we should consider the fœtus entirely distinct or unconnected with the mother; or rather as having no further connexion between them, than that which may be dissolved without causing a solution of continuity; or perhaps it may be admitted with some plausibility, that they are connected in a manner similar to that in which the various vegetable seeds are to their mother stalks previous to their maturation: at which period we observe the temporary union is dissolved, and they fall off spontaneously. It is not until they have arrived to this state of maturity and independence, which prepares and enables their delicate organs to receive nourishment directly from the earth, that they are disengaged from their maternal dependence.

In like manner, the female of the animal kingdom, when pregnant, may justly be said to bear seed, which become ripe at the usual period of parturition. At this crisis the temporary union of the placenta, with the uterus is dissolved, and the fœtus ushered into light and life.

GALEN.

REPLY TO "COMMENTATOR'S" REMARKS ON GALEN'S COMMUNICATION.

To the Editor of the Farmers' Register.

I have seen in the 12th No. of your Register, Vol. II, "Remarks on the papers contained in No. 9 of the Farmers' Register," by "Commentator." I beg leave, Mr. Editor, to subjoin a few of his remarks. "With Galen's communication, I was, upon the whole, much pleased; although I must say, that he delivers his opinions—however important the subject, rather too abruptly. For instance, he asserts—without the slightest doubt or qualification, that as to plants, "the earths afford no real nourishment themselves, but act entirely as exciting agents." Now, do not all agriculturists admit that there *is* such a thing as *the food of plants*, and that it is supplied either by *the earths*, or *by water*, or *by both?* Will they not also admit, that "exciting agents" cannot, with any propriety, be called suppliers of food? Where then is Galen's authority for assuming *that* as a fact universally admitted, in support of which, he offers nothing, but his *ipse dixit?* His concluding sentence furnishes another instance of a highly important assertion, entirely without qualification, or illustrative argument to sustain it. I subjoin his own words: "There is a wonderful similarity between the vegetable and animal world; they are both governed by the same laws—the various agents that act upon them are similar," (to both these assertions there are numerous and striking exceptions,)—"their organization in many respects the same, and they both possess motion, sensation, and life." This last assertion also, is much too broad; for, not to cavil at the term, "possess motion," instead of the power of motion, the motion and sensation ascribed to vegetables are as really unlike the motion and sensation of animals, as any two things can possibly be, between which any sort of resemblance has been supposed to exist. Such fanciful analogies may do very well as ornaments of style, but not for scientific agriculture."

"Commentator" thinks I have delivered my opinions "rather too abruptly"—be it so. I wish, however, to be particularly understood, and if "Commentator" has read my communication in the February No. of the Farmers' Register with attention, he will do me the justice to say, that I confined my remarks to the simple or primitive earths, viz: silex, lime, magnesia, alumine, and barytes, and not to compound earths containing foreign or extraneous matters. With all due respect to the opinions of "Commentator," I must be permitted to remark, that I have been educated to believe, and do now believe, primitive earths afford no real nourishment to plants, but act on vegetable and animal matters, hastening their decomposition: and the principles arising from the decomposition of water, air, vegetable and animal matters, feed and nourish plants. If the food of plants is supplied from primitive earth, why the necessity of adding manure? Seed, deposited in silex, lime, magnesia, alumine, or barytes, may possibly germinate, and live until the germ has devoured its farinaceous matter, but they cannot possibly mature with all the atmospheric air and water that can be given. This I suspect "Commentator" will admit, and if admitted, would it not be fair, at least, to infer that they do not contain in themselves any nourishment, but act on foreign agents as stimulants or excitants? "Commentator" asks this plain question, "now, do not all agriculturists admit that there is such a thing as the *food af plants*, and that it is supplied either by the earths, or by water, or by both? Will they not also admit, that 'exciting agents' cannot, with any propriety, be called suppliers of food?" Yes, all agriculturists must admit that there is such a thing as the food of plants, but I am strongly inclined to think, *all* will not admit that it is supplied by the primitive earths. Again, I take leave very respectfully to remark, that "Commentator" is mistaken if he is under the impression that I have stated exciting agents are suppliers of food—I have not, nor did I intend to convey such an idea; I merely stated, that earths were exciting agents—lime, for instance, acts upon straw, or some extraneous matters, and becomes the exciting agent in their decomposition.

With regard to my concluding sentence, which seems to "Commentator" so very objectionable, I believe philosophers of every age have thought with me, or perhaps I have thought with them, that "there is a wonderful similarity between the vegetable and animal world, &c." Yes, the various laws and agents, I think, are similar, for they are both acted upon by similar causes, viz: light, heat, air, water, food, &c.; and I might add, that both kingdoms are surrounded by ten thousand irritants, that act upon, and effect them in a similar way.

I believe vegetables not only have the power of motion, but possess motion in some degree, and I am not alone in this belief. Many plants are said to recede from the approach of the finger, and we have all seen the tall sun-flower turn to the *great luminary*, face to face, and follow him throughout the day. With respect to vegetable motion and sensation, I do admit it to be very *unlike* the motion and sensation of animals. As it regards "fanciful analogies," they are common, quite common: perhaps they are to be found in some of the "Remarks on the papers contained in Nos. 9, 10, 11, of the Farmers' Register," my "*ipse dixit*" to the contrary notwithstanding. I am much pleased with "Commentator's remarks," and regret that he did not commence with the first Vol. of the Farmers' Register.

GALEN.

The following letter was evidently written as soon as the article referred to had been read, and before noticing that the earlier piece of "Viator" had been discovered and republished in a later sheet of the same No. But though the first purpose of our correspondent has been anticipated, his after observations are not the less interesting and deserving of notice.

ON MILKING COWS.

To the Editor of the Farmers' Register.

Baltimore, July 3, 1835.

I was much pleased this morning with the article in your July No. on the spaying of cows, and write this note merely for the purpose of putting you in possession of the information necessary to complete the historical part of the discovery. In Vol. XIII, page 53 of the *American Farmer*, (April 29, 1831,) you will find an article copied from the New England Farmer, signed "Viator," which contains the first and only record of Mr. Winn's experiments. It is undoubtedly the article from which the French obtained the suggestion; and this will not appear strange when it is recollected, that the American Farmer was regularly received by one or more of the agricultural societies of France, by Lafayette, and several others. I have full confidence in the success of the experiment, if fairly and properly tried; but have endeavored in vain to induce persons having the means to make the trial. Indeed I have not been able to find any one who could perform the operation. As you have the American Farmer to refer to, I have thought it unnecessary to copy the article. By the way, I had almost forgot to state the cause of my pleasure on reading your article: it was with the very excellent directions given in it by M. Levrat for performing the operation, which will enable almost every one, of *nerve*, to spay a cow. I should much prefer throwing the cow down on her right side, with her head declining upon the side of a moderate hill obliquely downwards, her back towards the declivity. But probably the best fixture would be the *gallows*, or frame, in which the smiths sling oxen for the purpose of shoeing.

Much of the advantage of spaying will of course depend upon the previous management of the cow. A good cow, of almost any breed, may be secured by proper management with the first and second calf. The young cow should have plenty of good pasture, pure water, and salt, regularly; then, if she be not allowed to suckle her calf, after the udder shall have become healthy, (generally three to seven days after calving,) if she be regularly and *thoroughly* milked at six in the morning and six in the evening, I would be willing to warrant her to become a first rate cow when she has her third calf. It is as important that a cow be milked regularly as to time, as it is that she be properly fed. Nature accommodates herself to all our practices, provided they be not unreasonable: but she will not be trifled with. Therefore, if a cow be allowed to suckle her calf, she gets in the habit of secreting a certain quantity of milk every half hour or so; and when the calf is weaned, we cannot correct the habit so as to adapt it to the required milking every twelve hours: therefore, the calf should not be allowed to run with the cow at all; nor to suck her, after her udder is in order. Neither should we be careless as to the times of milking. The day should be *equally* divided, else between the morning and the night milking, there will be fourteen to sixteen hours, and between the night and the morning there will be only eight to ten; and the consequence will be, that nature will be baffled in her regulations of the animal's habit, and she will be injured as a milker. Now, if a cow has had all this previous care and attention, she will, four weeks after her third calf, come to the pail with a full bag of milk, and may then be secured as a permanent milker by spaying; as I verily believe, both from the facts stated by "Viator," and the experiments of M. Levrat, and from the reasonableness of the theory. I hope some of your friends will try it.

When I began to write, I only intended to inform you where to find the record; but my pen has run wild. When I get upon a subject of this kind, I never know when to stop.

GIDEON B. SMITH.

ANTHRACITE ASHES.

The *Philadelphia United States Gazette* says, "a lot of land, clay and sand, was covered over with ashes from anthracite coal, and clover seed sown upon it in abundance. The clover after waiting a little while longer than usual, sprung up like an ill weed, and about two weeks since presented a luxuriance of growth exceeding any thing of the kind we ever saw. The clover had the appearance of tall pea vines, so rank had it shot up. If anthracite ashes have such virtue, it would be well for the public generally to understand it."

From the New England Farmer.

SCRAPING FRUIT TREES.

East Hartford, June 15th, 1835.

Dear Sir—I have for the two last years scraped my apple and pear trees towards the latter part of June or commencement of July, and think from the experiment it is much the best season to scrape the ross from the body and large limbs of fruit trees, I have ever tried. I prefer to scrape them with a hoe soon after a rain, as they scrape much better when moist.

It is well known that many apple trees bleed, turn black, and are much injured, when scraped in the spring season. I knew it was the rule with some farmers (if they had a tree in their orchards that was unthrifty, or was not good to bear) to peel off the whole bark from the body of the tree during the longest days in June, and that a new bark is soon restored at that season. If the trees are scraped abundantly, and some of the bark entirely torn off, they heal immediately and do not bleed. I cut several decayed limbs from one tree two years since, which healed over much better than when trimmed in the spring. I think the fruit on those trees scraped in the above manner much improved in size, as well as in the general appearance of the trees.

"FLORIDA COFFEE."

To the Editor of the Farmers' Register.

Early in May last I had an opportunity, for the first time, of seeing some young plants of what has been called "Florida coffee," from which I was satisfied that it is not *okra*, and that it is probably a species of *cassia*, several of which are natives of the southern states, and are particularly abundant in Florida. This opinion I expressed at the time in a letter to you: and I perceive from an article in your June number, that it is confirmed by Mr. Herbemont, who states that is a *cassia*. When the plants which Mr. H. is cultivating shall have been fully developed, he will no doubt be able to ascertain the species, and thus we shall arrive at a knowledge of the true nature of the plant.

H. E. C.

June 20th, 1835.

COTTON SEED AN ARTICLE OF FOOD.

To the Editor of the Farmers' Register.

It was formerly said that in some of the southern states the negroes were fed on cotton seed. In this there was no truth whatever. I was therefore not a little surprised when I read (in the Encyclopædia of Plants,) that cotton seed are used in the south of Europe, by the poorer class, as an article of diet. As they have none of "Follett and Smith's Hulling Machines," it would be curious to know how they dispose of the outer covering of the seed.

H. B. C.

For the Farmers' Register.

NOTES OF A HASTY VIEW OF THE SOIL AND AGRICULTURE OF PART OF THE COUNTY OF NORTHAMPTON.

The county of Northampton, which forms the lower part of the peninsula called the Eastern Shore of Virginia, presents a remarkable appearance of uniformity, in the level surface and general qualities of the soil, and in the mode of tillage and general management. The land has but little elevation above the water which almost surrounds it; and the level of the surface is rarely changed so much as to effect tillage or labor injuriously—and nothing deserving to be called a hill is found any where, unless the abruptly rising (though low) borders of creeks be so designated. The soil is universally sandy, and differs very little in texture or appearance, and is not more than three or four inches deep. On the bay side, below the sandy subsoil, there is generally a yellowish clay, lying from twelve to sixteen inches below the surface, and which is open enough to permit the filtration through of rain water. Below the clay is a barren white sand. The clay is generally deficient entirely elsewhere, or is not found within several feet of the surface. The rate of fertility, though made different by nature, and still more so by the difference of treatment under tillage, is yet more uniform than any other considerable tract which I have observed. No one acre seems to have been very far below the medium grade of natural productiveness, and not many are very much above it. No land was seen which appeared half as rich as the best soils west of the Chesapeake—and none as poor as the worst—which are far more abundant than the rich, on both sides of the bay.

Flat and narrow as the county is, (the mainland varying between two and eight miles in width,) there is a central ridge of a little more elevation, and of worse and poorer soil than the lands on the bay and the sea side. Of the two last, the lands on the bay are generally the best. But a very large proportion of all the lands lie on the bay and the Atlantic Ocean, or on the creeks and inlets. It is said, that there are very few farms in the county distant more than a mile from navigable water. This is an immense advantage enjoyed by the farmers—and another connected with it is, that every Atlantic market is open to their choice. A string of long, narrow and low islands, barely separated from each other by inlets, serve to protect the mainland from the fury of the ocean, and in the navigable sounds, between eight to twelve miles wide, keep comparatively smooth water, when the wind is producing awful effects at the distance of but a few miles. These islands are part of the chain which reaches from Florida to Delaware, and offers between it and the mainland, a safe inland navigation for stout sea vessels, which is scarcely interrupted by too shallow water, or too open sea, during the whole distance.

The waters bordering on and intersecting Northampton, are not more valuable for navigation, than for furnishing in great plenty and variety, fish and wild fowl. The greatest delicacies for the table which salt water yields, are here common and cheap: and coarse fish, which are prized in our fresh waters, are here caught in such numbers, that they form a valuable resource for manure, which a few enterprising farmers have already begun to profit by using.

Though the soil is sandy, and almost universally so, it is less so than is generally reported. I saw but little land that seemed as sandy as much of the county of Surry—and the greater portion of the soil is not more sandy than part of Lower Weyanoke in Charles City, the farm of the late Fielding Lewis, which, since being limed, is so productive under wheat, as well as in the crops more suited to light land. Yet scarcely any wheat is made in Northampton—and from the very few trials of this crop on a small scale, it has been decided generally, (and no doubt correctly,) that the soil is quite unfit for the profitable growth of that crop. The use of lime, or other calcareous manure, would probably remove the existing obstacle to wheat culture: though even then it might not be so profitable as the crops now preferred. Wheat has been often raised with sufficient success to encourage the farmer to persevere in the culture. But he has invariably found that there was a great diminution of product when wheat was sown a second time on the same land, in its proper turn in the rotation. I have heard of a like result on the sandy land of Sussex, as ascertained by two rounds of the rotation of a very intelligent practical farmer.

The rotation of Northampton, which may be almost said to be universal, is 1st, corn—2nd, oats—and so on every year as long as cultivation is continued on the same land—and that has been known to be, on some fields, and those never manured at all, for more than sixty years. The only material variations are in the management of the land in the interval of time between reaping and stacking the oat crop, and ploughing the land in the next winter, or early part of spring, for the succeeding crop of corn. Some very few farmers permit no grazing: a greater number graze during that whole time, but not so closely but that much of the volunteer growth of vegetable matter remains to be turned into the earth by the plough. The others, and they are the far greater number, graze as closely as can be done by all their live stock. Some even believe that the closest grazing is most beneficial, and leave the fences down that their fields may be a common pasture for all the roaming stock of the neighborhood, between the removal of the oats and the beginning of preparation for corn. Ten or twelve years continuation of this latter practice, in at least one case, has not served to prove so satisfactorily, to the individual who has pursued it, the evil of the practice, as to put a stop to it. But the grazing in general, is not so close as might be supposed from the unrestrained access of each farmer's live stock, because their number is kept small by the nature of the land and mode of tillage. There is but little grazing land before the oat harvest—and the products of live stock, as well as their numbers, are smaller than usual elsewhere. This fault in their husbandry, (as it may be considered in one respect,) perhaps has saved the fields from exhaustion.

Whoever may for the first time hear this rotation described, will be ready to pronounce it as having been devised and commenced in ignorance, and carried on in direct and manifest opposition to all the established principles of agricultural science—and that persisting in it for any considerable time, must always be unprofitable to the farmer, and result inevitably in the destruction of the fertility of the soil. But strange as it may appear that such a rotation should be in general use, it is still more so, that it should be maintained by the general, if not universal testimony of the inhabitants, that the production of the county, for the whole space under tillage, has not been diminished under this system—that the exhaustion of particular farms when worst managed, has neither been rapid, or considerable, in any short term of years—and that when attention has been paid to collecting and applying manures, and grazing has been prevented, the most enlightened farmers concur that the rotation, so aided, has been found to increase the crops regularly, and for a long term: in short, that the rotation is decidedly an improving one, when judiciously conducted; and most probably that it is better for the farmer than any other more conformable to the generally received opinions on agricultural improvement. It must be at least admitted, that many and strong facts, and those tested by long experience, are brought to sustain the superior advantages of the Eastern Shore rotation.

There is one additional feature of the tillage here, which in many cases has had much influence in aiding the benefits, or lessening the scourging tendency of the rotation. This is the growth of a plant which has great value as an improver of fertility, and which is peculiarly adapted to sandy soil, and to the succession of crops here in use. The Magothy Bay bean is a plant of the pea tribe, and the whole of that tribe seems to possess greater power than any other for acting as manure. Clovers are of the pea kind, and red clover stands at the head of the class of green manures. But though a good cover of Magothy Bay bean is probably of far less value as manure than a good cover of clover, yet the former growth in general is more valuable, because requiring no regular sowing, but very slight care for its perpetual preservation, and producing crops far more luxuriant than could possibly be obtained of clover, and perhaps of the most worthless weeds on the like sandy soils. The seeds are very hard, and slow to vegetate, and will remain sometimes for years in the soil before sprouting. This quality prevents the tillage of corn, however perfect, serving to root out, or materially thin the after growth. The spring ploughing for oats retards the springing of the plants, until the oats are enough ahead not to be injured by the undergrowth of beans. At this time, (July 10th,) the reaping of the oats is generally going on, or has been just finished where most forward. The undergrowth of Magothy Bay bean is from three to eight inches high, according to the condition of the land, (rarely more than six inches) and is not a material impediment to reaping and saving the oats. It is even now a beautiful growth—but its present appearance is nothing in comparison to what will be exhibited in August, and from that time to frost, according to the descriptions given of the well covered fields, and which I can well believe from the more sparse growth which I have seen matured at home. The flowers are very abundant, and of a deep and beautiful yellow—and continue to open for many weeks. The whole plant was well described by Bordley, as a "Lilliputian locust tree," with which it agrees in the general form of the flowers and leaves. The beans rise rapidly as soon as the shelter of oats is removed, and acquire a height usually varying between one, and two and a half feet, according to the land. Even where no care whatever is taken to preserve the succession of plants, and indeed where the tillage and grazing (under the common rotation) is such as would effectually destroy any other kind of any value, this continues to be the most general cover of the land after the oat crop—though, of course, a scattered and thin cover compared to what is found under more favorable circumstances. Cattle feed on this plant, and indeed find not much else in the fields, after the scattered oats have been picked up. Hogs strip off the green pods, and to the extent of their operations, destroy the seeds. When matured, the seeds are so hard that they would probably pass through the body of an animal uninjured. The plant is an annual. The leaves fall before winter, and the stalks seem so hard, that many persons would on that account deem them of but little value as manure.

In the few cases where the land is not grazed at all, and even where the small number of the farmer's stock prevents much of the bean cover being taken off, it is evident that there are sufficient means afforded to preserve the succession of the growths of this plant. Where several successive hoed crops, or other circumstances, have thinned the bean cover, it is easily increased by a means used by those who attach proper value to this improving crop. Numerous plants spring up in the land under corn, which are generally, of course, destroyed by the ploughing of that crop. But near the plants of corn, some bean plants will grow out of the way of the plough: and as but little hand-hoe work is used, or required, the neglect of weeding, as well as the design of spreading the growth, serve in this manner to furnish numerous seeds to be added to those then buried in the earth, and which will spring the next year.

Where the land is not grazed, or even when the grazing is but slight, the Eastern Shore rotation, though nominally the same, is in truth altogether different. It then consists of a regular succession of *three* crops—corn, oats, and Magothy Bay bean—the last being a *crop of manure* regularly turned in to sustain the land under the two succeeding grain crops. This improved practice would take away the objection to the perpetual succession of grain crops—and presents a rotation perhaps as conformable to sound theory, and furnishing as large a supply of food (*grown on the land*) for plants, as is found in the best modern practices under what are called three and four-shift rotations. The circumstance that this three-shift rotation has only two years' length, is decidedly in its favor. If all other things are equal, and an equal proportion of the rotation is of meliorating effect, the more crops that it will furnish the better, within any certain term of years. One of the greatest causes of the superior productiveness of the farms in Flanders, is found in the frequency of secondary crops, by which two crops are obtained from the same field in one year. The great objection to such cropping in this country, is the amount of labor required at very busy seasons, and that the low price of land offers no inducement for such perfect tillage. But the secondary crop of the Eastern Shore rotation requires no trouble or cost of preparation or tillage—and therefore may be used to the greatest advantage where the peculiarity of soil favors the growth of the Magothy Bay bean—and forbids (as is supposed to be the case here,) the adoption of other courses of crops, which would be incompatible with the growth of that valuable plant.

It may be asserted then, according to the foregoing views, that the mere difference of using this green crop directly as manure, or for grazing, will serve to place the usual tillage of this country under a mild and improving rotation—or under one which, though it seems not to be ruinous *here*, well deserves to be so, and would be so, I think, on any other land to which my labor, or personal observation, has been directed. And why it should be otherwise here, I cannot hear or conceive a satisfactory reason, though the fact is readily admitted to be true. The reason which is generally assigned for the sandy soil here bearing up so long under the worst use of the corn and oat rotation—and for being actually improved under its best use—is the beneficial influence of the air, which is supposed to be loaded with salt vapor from the adjacent and almost surrounding waters of the Chesapeake and the ocean. Without discussing the truth of the fact of salt being thus continually conveyed to the soil, it seems incredible that salt in any quantity can act as an alimentary manure to grain crops, or perpetually renew the whole or any portion of the wasted fertility of soil. From time to time, persons have discovered great value in salt as a manure—and much more frequently its use has been found of little value, when not decidedly injurious. But the most sanguine advocates for the use of salt as manure, have not supposed it to give *directly* food for plants, as dung does, or as being a manure which by annual repetitions can possibly continually renew the productive power of land. If this were so, surely men might copy nature's practice in this respect, and wherever the price of salt did not forbid its use, inexhaustible fertility might be produced and maintained. But I cannot think that any vapor, salt or fresh, can be serviceable to grain crops, except as furnishing additional supplies of moisture: and this effect, though highly beneficial to grass crops and grass husbandry, when considerable, is at least of very doubtful advantage to grain crops.

But I repeat that there is no question of the great power of these lands to resist exhaustion under a scourging and barbarous course of tillage—nor of their fitness to be easily and profitably improved by the best practices already (though rarely) here in use. I do not rely for this conclusion on the experience of any one farmer, however intelligent and well qualified to judge, and however much entitled to command belief, and the utmost respect for his opinions—nor on the state of any particular farms, long kept under either good or bad culture. I have heard many proofs of these kinds which might be adduced by others. But my cursory views and hurried inquiries having been limited to but a few days of personal observation, they were not sufficiently accurate for such detailed statements, even if that course were not forbidden by the length to which they would extend this sketch. Such details, however, from those possessing better means for observation and the collection and comparison of facts, would be highly valuable and interesting—and it is earnestly hoped that such will be given to the public at a future time, by one or more of those better fitted by their location for the task. If I can attract attention to subjects which deserve it, and induce any others to furnish more accurate information, my end will be accomplished: and even the inaccuracies, or unintentional misrepresentations, which my very imperfect notices may perhaps exhibit, will not be regretted, if other persons should be thereby drawn forth for their correction, and to supply the more numerous deficiencies. This has been the motive of my offering such hasty and imperfect observations, and must serve as my apology for doing that which in general ought always to be avoided—that is, writing and publishing opinions on subjects that we know very little about. But by such means, in several former cases, very valuable and interesting communications have been elicited from others, and discussions have been produced which have shed much light on agricultural practice and opinions. To similar effects, I hope these imperfect notes may be the humble instrument of impulse.

To return to general results. Very little land in Northampton, compared to the mainland of Lower Virginia, has been "turned out" of cultivation, because exhausted, to grow up in trees. And where this has been done, though of course the most impoverished land was so treated, the motive was in part to permit pine timber to grow, to supply the place of that which was taken off from the small amount of woodland on the farm. Wood and timber are very scarce, and but little land is given up to even the growth of what they have, which is unfit for building purposes, and but of small value for fencing or fuel. The extensive clearing and destruction of good timber has been caused by the demand for land for cultivation, and encouraged by almost every acre of dry land being fit and profitable for the plough. I have seen scarcely any land recently "turned out:" and all which has been at any one time thrown out of cultivation—admitting all to be on account of extreme poverty, and for the purpose of being recruited in fertility under pines—must be inconsiderable. Therefore the continued productiveness of the county in general, cannot be materially aided by this cause. Neither is it to be attributed to the great and profitable improvements made by particular individuals, by means of using manures not derived from their own fields, whether putrescent or of a more permanent character—for these examples have, unfortunately, been too few to have a considerable effect on the general products and profits of the county. The lands which have produced nine-tenths of all the grain in the county, and those which now produce as large a proportion, probably may embrace not one farm which has been so badly cultivated as to have been kept up by the "turning out" system—the pine-tree-manuring it may be called—nor one on which the owner has used lime, shells, or any manure purchased or brought from abroad. Excluding then the most exhausting and bad cultivation, and also the most improving and profitable, the remaining lands will show fairly the effects of the usual mode of tillage in this county—and in general, they appear to be such as will be now stated.

According to the system of tillage described, there is no such thing as any field having a year of rest: every acre (except the small amount of woodland reserved for timber and fuel, and the still smaller amount of land "turned out,") is under a crop once a year. Of course, *supposing products to continue equal*, there is twice the amount of cultivation, of amount of crop made, and of laboring and consuming population, as there would be if the land was at rest, and producing no crop two years in four. The people are in an uncommon and remarkable degree, (for Virginians, I grieve to say—) attached to the place of their nativity, and seldom think of emigrating to the far west, or even to the "Western Shore," (as they call all Virginia except their own narrow streak of land,) unless driven by the impossibility of obtaining a laborious support at home. It follows that the people are too many for the land, as it now produces, and the demand for land, both on purchase and rent, is as high as the profits of cultivation will permit—but not higher than that point, as is abundantly proved by the permanency of such prices, as well as by other circumstances. It may be safely asserted, that the average price of land in Northampton, is three times as high as that of the average of the lands in Prince George and Surry, which border James River and extend back eight miles, and for nearly all of which, marl might be used with sufficient facility and profit—an immense benefit of which the Eastern Shore is deprived. In all that space, embracing some of the best and some of the poorest land in Virginia, though there are a few tracts which might sell for $30 the acre, the average price would hardly exceed $5—and many tracts containing marl, notwithstanding the increased demand and price for such land, would sell for $3. In Northampton, there is but little land (excluding the sea islands,) under $14, and much would now sell for more than $20—and the average price throughout would not be less than $15. It may however be objected, that such prices cannot be founded on correct estimates of profit, and therefore are no certain evidence of value. It would be very difficult to put down such an objection to high prices, if every man tilled his own land. But the best proof is offered here in the fact, that a considerable proportion of the soil is regularly tilled by tenants, and that there is demand for all offered to be rented out, at such shares of the crops as will pay six per cent. net, on the purchase, at the high existing rates. This is sufficient proof that the landlord can afford to buy and to retain land at the present prices. And if a tenant pays too high rent, he cannot fail to make the discovery by the time a year has passed. It may be safely assumed that annual rents, in general in every country, and especially in the United States, can never remain higher than tenants can afford to pay. Poor land is here rented, and cultivated in the ordinary rotation, at never less than one-third of the grain, and also of the smaller, yet important crops of castor bean and sweet potatoes. If of a little better quality, (and yet such as appeared to me quite poor,) it will pay two-fifths of the corn, and one-third of the oats and other smaller crops. Good land, say any yielding four barrels of corn, may be readily rented to tenants for one-half the crops made. The landlord keeps the buildings in repair, and the tenant the fences. For land of apparently equal productiveness in Prince George, not half the same nominal rent can be obtained—nor can lands be rented out at all, as a regular and continuing system, to any who will so cultivate and manage them, as not to injure their value nearly as much as the amount of rent is worth. From all that has been heard on this subject, I cannot but believe that the lands of Northampton are well worth their present prices, under their present management: and, if from so slight a glance I may presume to offer the opinion, it seems equally clear, that by retaining what is really excellent in their system, avoiding some very general errors, and adopting means for additional improvement, which are quite available and yet almost totally neglected, that the same exercise of industry and economy so directed, would advance the net profits, and of course the prices of land, to the double of the present estimates.

It is admitted that there are reasons why the Northampton lands should be worth more in proportion to their average and continued returns to the acre, than most other lands. Such reasons are presented in the almost entire absence of all waste and worthless spots, whether in ravines or hill-sides, or for want of drainage—great ease of tillage, caused by the soil being level, dry, and light, and by its being kept always clean by annual cropping. But though these are important causes of value, they are not greater than the different advantages which other lands west of the Chesapeake possess, and which, notwithstanding, are at prices very far inferior. The cheapness and profit of marling on many poor soils, and their after fitness for wheat and clover husbandry, and the natural fertility of the best soils, seem to be at least a fair compensation for the want of other advantages peculiar to the Eastern Shore. If then the latter lands are held at fair prices, as there seems no ground to doubt, the good or improvable lands west of the bay are just as much below fair prices, as they are below the usual prices in Northampton. Why this remarkable difference should exist, is an interesting subject for inquiry, and the results would serve to throw much light on the causes of the general decline and low state of the prices and profits of landed property in Virginia. From the slight view which I have been able to take, it appears that the principal cause of the remarkable difference in the prices of lands on the Eastern Shore and in the balance of lower Virginia, is found in the difference of the modes of thinking and acting as to continued residence, and emigration. It may be said truly that the people of the Eastern Shore only, of all the inhabitants of Virginia, as a community, feel that they are *at home*—that they and their children are to live and die where they were born, and have to make the best of their situation. Compared with this state of things, the population of the balance of Virginia may be considered as in a state of *transition*—having future migration in prospect, either for themselves or for their children. If only one-third of the community are operated on directly by such considerations, they are enough to bring all the lands of the country to the prices and condition of their own. With so much land always offered for sale, and at almost any sacrifice, the prices of all must necessarily and continually decline. The formerly contented and industrious and successful improver of his farm, finds that it has sunk in price more than his expense incurred for its improvement—and that he might have bought at a lower price the lands about to be deserted by his neighbors. Hence grows discouragement to all permanent and valuable improvements—general and increasing discontent with their homes—and next the willingness, and finally the expectation, of following to the west the more enterprising, or more greedy, who had gone before them. The long continued prevalence of such opinions and habits are alone enough to ruin any country: and the mere absence of this curse seems enough to maintain the superior thrift and prosperity of the county of Northampton. The opposite conditions of the two communities may be compared to the different operations of the institution of marriage when indissoluble except by death, and where the law offers and invites divorce at will. In the former state, the parties are compelled to make the best of their union, and in the latter they would as certainly make the worst of it.

From what I could gather of the opinions of farmers of this county, it was inferred that the land was naturally, as it still appears, of middle quality as to productiveness. I heard of no farm, or even a field, which was supposed by its owner as having in its best and original state, to have produced more than 30 bushels of corn to the acre—which is certainly a very moderate crop on land peculiarly adapted to that grain. Probably in some places near the creeks, there were spots of much greater natural fertility: but all such could not have amounted to any great extent. I saw no land, other than the highly manured lots about dwellings, which now would produce 30 bushels; and not much which by its present growth promised more than 20 bushels of corn. Still I may be deceived in this respect, not only for lack of judgement, but because the grain may be greater in proportion to the general bulk of the plants, than on other soils. This is asserted of their oat crops, which appeared to my eye generally meagre, and very few spots were seen where the growth was very luxuriant. Yet it is affirmed that their ordinary round stacks will yield not much short of 200 bushels—and if of wheat, and elsewhere, they would hardly exceed 50 bushels.

The land was formerly covered with a heavy growth of excellent timber—oaks of different kinds, hickory, &c. as well as of pine. But almost nothing is now left but pines, and those of late growth, and of course very worthless both for fuel and timber. This remaining cover of the land not brought under cultivation, gives it an appearance of having possessed but little fertility, as we involuntarily associate an unmixed growth of pines with the idea of worn out land, or a bad natural soil. But though such growth is probably found here on better soil than it would indicate elsewhere, the general if not universal disposition of this land to throw up pines is enough to prove that it is no where *calcareous*, and that it is much wanting in that essential quality of soil. On the other hand, the rare occurrence of land naturally very poor, and the general and remarkable durability of all, would seem to forbid the conclusion that much of the soil was of such acid quality as lands favorable to pines generally possess. There can however be no doubt but that an addition of calcareous earth is every where wanting, and on every field would give increased productiveness and value. Very little use has been yet made of this all-important means for improvement. There are no beds of fossil shells, or rather they here dip too deep to be reached by any digging yet tried—and some few wells have been sunk to the depth of 40 feet. These beds disappear on the Eastern Shore of Maryland, by sinking gradually as we approach the south, (as stated in Dr. Ducatel's geological report,) and it may be supposed that they underlie the counties of Accomac and Northampton, though at a still increasing depth. But though thus deprived of easy access to this the most cheap and valuable form of calcareous manure, the quantity of shell fish would furnish lime in abundance—and there are many oyster shoals, naked at low tide, where immense quantities of shelly matter might be cheaply obtained. This if crushed would be better than if burned, as there is much putrescent matter which is destroyed by fire. The little use which has been made of quicklime (not extending beyond a few experiments) has not produced results which encouraged the repetition—and hence has arisen the opinion that prevails unfavorable to the application of calcareous matter in general. My observations did not reach farther north than about the middle of the county—but I heard that some gentlemen nearer to Accomac still persevered in using lime. It is not at all surprising that quick or caustic lime should be even hurtful to these lands, however much they may need mild calcareous earth. From the dry and sandy nature of the soil, and the continued tillage to which it is subjected, there can never long remain any inert or insoluble vegetable matter; and on all the vegetable matter in the soil, fit to feed plants, or rapidly becoming so, the caustic and burning action of quicklime is decidedly injurious, by decomposing and dissipating such matters. Thus the early destructive power of the lime, applied in its quick state, has here apparently overbalanced the more slow and permanent benefits which it afterwards produces as mild calcareous earth. This is one of the numerous cases in which a want of the knowledge of the mode of operation, causes even facts to lead to false conclusions, instead of teaching truth, as they would do, if properly understood. It is of great importance to this country that a proper estimate should be made of the value of calcareous and marine alimentary manures, as there are great facilities for obtaining both, as well as great need of them on most of the soils.

Next to corn and oats the castor bean, and sweet potatoes are the most important articles of culture in Northampton. There are seven oil presses in and near the little village of Eastville, and perhaps more than twice as many in the whole county. New ones are now erecting. One is to be worked by steam, for which the machinery is provided, and the necessary fixtures are now constructing. This seems a singular, and I fear will prove an unprofitable application of steam power. The oil cake, or "bean pomace" as it is called, is highly valuable as a rich and sure manure. It sells readily at 25 cents the bushel at the oil factories. Its effects are very great, as may be inferred from the price, but they seldom last beyond one crop, unless heavily and wastefully applied.

There is much difference of opinion as to the value of castor bean as a crop, and its effects on the soil, even among those who have most experience of this new kind of culture. One practical and judicious farmer, who is considered very successful in his business, and who had formerly obtained unusually heavy products of castor bean, told me that he would not continue its culture for the highest price ever known. His principal objection was to its supposed exhausting quality. Others think it not more exhausting than corn—but it requires rich land, and cannot be continued on the same, without an immediate and considerable decline in product. But though a second crop of castor bean will not do well on the same land, if immediately succeeding the first, corn will produce as well, and some think better, than on the same land if not preceded by the bean. The management of this crop is very troublesome, when the time arrives to cut the ripened clusters. If not cut immediately, the outer coverings open and waste the seed—and indeed there is no avoiding great waste in this way. The clusters ripen successively, and ten or twelve times it is necessary to cut over the field, before frost stops the labor by preventing the later beans' maturing. Some persons, who do not consider the crop as particularly exhausting to the soil, are not satisfied that they have gained by this partial departure from their old and general rotation of corn and oats. The castor bean has not been made a part of any regular plan of rotation.

The crop of sweet potatoes is here an important object, not only on account of the soil being very favorable to the growth, but because of the facility for shipping the crop to the northern cities, where good prices are always sure.

The business of grazing live stock is very limited, both in extent and in profit. There are no standing pastures of arable land, and of course, the fields cannot be grazed until after the oats have been reaped and removed. Before that time, the cattle have very scant fare in the woods, and on the firmer marshes which border parts of the sea side. But few give any land to artificial grasses. The soil certainly cannot be naturally favorable to clover: yet it is said that fine lots of this grass are made by the few who give the manure and preparation necessary for the purpose. But it may be said in general, that so far as green food is considered, the cattle have a feast from the middle of July until frost, and a famine the balance of the year. Of course, dairy products in general are very poor. Those who have no marsh pasture, or other waste land fit for grazing, and who take good care of their stock, rely entirely on their grain and offal of the corn and oat crop, not only in winter and spring, but through half the summer.

In the foregoing statements of the general results of the system of culture here practiced, I have chosen to rely more on general concurrent opinion, than on particular facts; because of the great liability of a stranger to draw false inferences from the few facts to which his observations must necessarily be limited. Nevertheless, it may be useful to add some few of even partial and defective observations of facts, which maintain the general views already presented.

When first reaching the shore, it was not so much my object to seek for uncommon though valuable improvements in farming, and the use of means not generally used or accessible, as it was to learn what was the general practice, and the good and profitable practices which might be generally adopted. My inquiries to this end led me first to the farm of Mr. James Goffigon, who has cultivated with success and profit, for more than thirty years, a farm having no facilities for improvement, except what its soil yields. It is on, and eastward of the ridge, midway between the waters of the bay and the ocean, and not touching either. The tillage has been throughout on the regular corn and oat rotation, with grazing after the oat harvest. The horses, (when not at work,) and the few cattle necessary to be kept about the house, and the whole stock of hogs, are kept in a space of two or three acres, and are supported almost entirely on grain, and the dry offal of the previous year's crop, until after the oat harvest. The cattle which are not wanting are turned out in the spring, and go to the marsh land on the sea side. The whole stock, being kept at such disadvantage, is necessarily small, in comparison to the extent of arable land; and they live in great plenty on the pasture after the oat crop, and are unable to keep down, or destroy the succession of the general cover of the Magothy Bay bean. Much manure is made in this very long period of penning stock—is made necessarily, it may be said, when litter is given, as is done here, from the pine woods, as well as the offal of the crops. But Mr. G. does not speak favorably of the effects of his manure—and indeed the summer penning on fermenting litter, would seem likely to be wasteful of the fertilizing principles of the manure, and injurious to the health of the cattle. No other means of improvement, worth counting, have been used: yet the farm has not diminished in product materially, if at all, since Mr. G. has known it, and according to the report of others, is still one of the most productive in the county. But though the farm lies in part on the "ridge," and consists partly of the worst kind of soil in the county, the greater part was of the best natural soil in the interior. The field now in oats is the most distant from the homestead, and a large part of it has never received any aid from manure. Mr. G. supposed that this part would now make 20 bushels of corn, and in its original and most fertile state, might have brought 30 bushels. He rents out the greater part of his land, and the poorest, for two-fifths of the corn, and one-third of the oats, castor bean, and potatoes.

Mr. G. disclaims all pretensions to the character of a good farmer, and attributes all his success to steady attention to his business. He certainly has been an excellent manager of his means: and his undoubted and long continued success, taken in connexion with the total absence of all uncommon, or foreign means for improvement, and his continued adherence to the Eastern Shore rotation, serve to place in a strong point of view, the peculiar and durable good qualities of the soil, and the profit of the rotation in general.

The smaller farm of Mr. Isaac Smith, on the sea side, furnishes an example equally striking, of the ease and profit of increasing the products of an impoverished soil, by using proper means, and such means only as may be availed of by all. Mr. S. took possession of this farm in 1819. The product has been gradually increased, on the same surface, until it is now doubled. Being on the sea side, and having some firm salt marsh for pasture, he has rigidly secured his fields from being grazed at any time, and thus has regularly returned to the soil all of the improving crop of Magothy Bay bean, and secured its regular return as a thick cover of the fields. In addition to this, and to the use of the manure furnished by the stock and offal of the grain crops, Mr. S. formerly had the benefit of the pomace of castor beans, which he bought to make oil for sale. But that part of his business was never extensive, and he has for some years ceased to make any oil, except from his own crop of beans, raised on the same farm. The use of this manure was not properly understood when he at first might have profited by it, and indeed it was scarcely used at all, or thought to be worth using, except to remove an offensive nuisance. It was thrown out of the factories in bulks, and left to rot and waste—and was used as manure most injudiciously and to great loss. It is now saved under shelter, and applied in very small quantities. Mr. S. thinks that the whole amount of this manure which he used, that was not derived from his own fields, could not have exceeded 1500 bushels of the pomace properly applied. This I mention because it is the only foreign substance which has been used to restore the lost productiveness of the farm—and this is certainly more than counterbalanced by the oil which is every year produced on, and sold from the farm. It would seem then, that whatever Mr. S. has done to improve an exhausted farm, may be done any where, by the means furnished by the land itself, and under the corn and oat rotation, provided grazing is prohibited, and due attention paid to the preservation of manures.

Mr. S. thinks that cotton seed must contain at least as much of fertilizing matter, as an equal bulk of bean pomace—and probably much more, as the former have lost none of their oil, and the castor beans lose all that can possibly be expressed by the most powerful machinery. But the great difficulty with cotton seed, is to apply them as manure without destroying the oil which constitutes their value. Violent fermentation, to which they are commonly exposed, must produce a great chemical change, and particularly on so putrescent a substance as oil. The manure is still rich, but perhaps half its amount and value has been wasted. If applied before fermenting, the seeds sprout, and in the process of germination, the oil is certainly changed to a far less valuable substance. Mr. Smith has tried steaming his cotton seed—and this seems not only reasonable as a means of preserving their whole value as manure, but his experiment of the effect fully confirms the supposition. I saw where the steamed seed had been applied to corn, by throwing a single handful into each place where the corn was planted, and the growth was at least double in luxuriance and in promised product. This is a valuable improvement for other parts of the country where cotton is a large crop. Steaming of seed on a large scale might be done with very little trouble or expense, the object being merely to destroy the germinating power of the seed by heat.

The valuable farm of Mr. W. L. Eyre, exhibits a high state of improvement, and of productiveness that is rare in this county—and which he has principally produced himself, and within the few years which he has been in possession. The land, however, though much impoverished, was originally among the best, which of course gave the greater facility to profit, by the application of putrescent manures. Mr. E. has also abundant means to use calcareous and marine manures, and has availed of them to some extent, but not so much as might have been expected. It is unnecessary to speak more at length on this head, as I can refer to a communication from Mr. E., at page 731, Vol. I. of the Farmers' Register. The old oyster shoals which are there described, are found in various places on both sides of the county. They would not only supply calcareous manure, but other kinds in the salt, the mud, and the remains of putrescent vegetable, and animal matters. Another excellent use might be made of this as a material for compost heaps, in which should be placed in layers the fish which may be here caught in great abundance, and at little cost. The calcareous matter would receive, and preserve for use as manure, the products of animal decomposition, and by the chemical action prevent all waste: and it seems probable also, that by the action of the animal products on the shells, (as they certainly combine chemically,) that the shells would be made more friable, and easily reduced, when put on the land. Mr. Eyre now has fish in compost beds of earth and vegetable substances: but these substances are very inferior to calcareous matter for the purpose of absorbing and retaining the products of animal decomposition. When fish are applied directly and without preparation as manure, it is the most wasteful of all the modes in which they are used. If properly used, the abundance and cheapness of this material for manure would make it of immense value to many farmers in Northampton.

It has been already stated that the renting of land is extensively practiced in this county—and it is still more general in Accomac, where the more minute divisions of land, (for Virginia,) the comparative scarcity of slave labor, and other existing circumstances, offer interesting subjects for inquiry and remark, which it is highly desirable should be presented to the public, by some of those who have the means. Large land-holders may, if it is desired, derive their entire income, with ease and with sufficient profit, from tenants. Though the terms of rent are only from year to year, changes are not frequent. Mr. John Eyre, of Northampton, has long had a large proportion of his lands in both these counties, in the hands of tenants. He told me that he had never denied a continuation of the possession to but one person. One held the same farm for 35 years, paying half the product as rent, and in that time increased the landlord's share from less than 40 barrels of corn, to more than 100. He did this in part by new clearings, and by using the means for manure which the location offered, and which the landlord aided in, and though not in his obligation, to his own profit as well as his tenant's. Another of his farms was held 28 years by one tenant, who then died, and was succeeded in the possession by his son. Such cases would seem to show that there is more attachment to rented land on the Eastern Shore, than is felt on our side of the Chesapeake for freehold inheritances on which the owners were born, and on which perhaps several generations of their ancestors were buried.

My conclusions as to the soil and culture of Northampton, are very different from the opinions which prevail among most of those who are equally strangers to them. It is not uncommon to hear the country spoken of as but little better than a mere sand bank, and the tillage as miserable as the soil. These of course are exaggerated expressions, and would be so admitted by those who use them to express the contempt they really feel. It is possible that I may have erred as much on the other extreme. But my opinions are founded on reports of profits and prices, and of long continued products, and not upon the appearance of the land, or the growing crops, and still less upon any excellence of the implements or processes of tillage. The great merit seems to be, that though neither of these are such as would command admiration, or even attract notice, that all the parts are well suited to each other. If I had merely judged of the state of agriculture by what was presented to my view, and without knowing any thing else, I should have certainly formed a very unfavorable opinion of the soil, the rotation, and the profits and prospects of the cultivation.

A GLEANER.

July 17th, 1835.

USES AND CULTURE OF RUTA BAGA.

To the Editor of the Farmers' Register.

The Swedish turnip, or ruta baga, is a most valuable vegetable for all kinds of cattle. Some horses refuse it, but generally they are fond of it. When designed for horses, the roots should be well washed and chopped up—but for cows or hogs this is unnecessary. Indeed it is thought that cows thrive better upon the roots in their dirty state; and when given whole, they are not so likely to choke them. The teeth of sheep may be injured by roots in very dirty condition—but all these cattle eat more slowly and securely, I think, if the turnips are thrown to them in an undivided state. I used a turnip cutter when I first began to feed them, but discontinued it as troublesome and unnecessary.

The Swedish turnip, when first eaten by milch cows, gives the milk and butter a flavor something like that of garlic. This is not unpleasant to some persons, and becomes less obvious as the digestive organs of the cattle more perfectly assimilate the food. It may be obviated, however, by dissolving an ounce of saltpetre in a pint of water, and putting a table spoonful of the solution into each milk pan as the warm milk is emptied into it.

In the winter season, the butter from cows judiciously fed upon ruta baga, has the flavor and appearance of grass butter. Half a bushel per day, divided into three messes, is a fair allowance. I have sometimes fed a bushel and a half to each cow per diem. The vegetable is very grateful to the animal, which while eating it, requires little water to drink. I have known cows refuse to drink water for several weeks when freely fed on Swedish turnips. Straw, corn fodder, or coarse hay, is at the same time essential to enable them to chew the cud.

The skin remains slack, and the health more vigorous and decided, by the use of these turnips; and the amount of barn-yard manure is much increased. It is best to feed twice or thrice a day. In fattening cattle, Swedish turnips, sprinkled with corn meal, gives the meat a finer quality, juice and relish. It is also an economy where corn is high in price.

The ruta baga is generally thought to be a troublesome crop; and many relinquish its cultivation from the difficulty of its management, *when not thoroughly understood.* The ploughing or ridging, drilling, hand-hoeing, and care, are peculiar, and much unnecessary labor and pains often at first embarrass the cultivator. But when once well comprehended, the crop is usually estimated highly.

We generally plough up a barley, wheat, or rye stubble, immediately after harvest; then roll and harrow it well. If we have fine manure, (we often use street dirt and bones,) this is hauled out and spread, and the ridges (two furrows cast together) are ploughed at once. These are rolled flat, and the seed drilled upon the top of them with a machine (a turnip drill) contrived for the purpose; or a porter bottle with a quill fixed in the cork, having a hole of sufficient size in the small end of the quill. If the manure is long, and intractable, the ridges are ploughed first, the dung is then carted and spread between them, and the double furrows are afterwards split, so as to cover in completely the long manure. The seed is sown tolerably thick. When the plant has four leaves, the supernumeraries are cut out with hand-hoes, leaving the finest plants from six to twelve inches asunder. Eight inches is the average width between the plants—if they are allowed to stand thick, the crop is ruined, and no fear should be entertained to cut out freely.

Before hoeing, a light triangular harrow is run between the rows to level the earth, and clear the ground from weeds. An implement with a slide behind and hinges in the front, so that the width can be changed at pleasure, according to the growth, is most convenient.

A mistake is often made with the turnip crop, in *hilling up* the roots by plough or hoe. The earth, on the contrary, should always be taken from the turnip. Its tap root is quite sufficient for its nourishment, and the bulb grows larger as the earth is *drawn from* it. The calculation is to hoe and cultivate the ground until it is quite level, harrowing or horse-hoeing between the rows, and hand-hoeing between the growing turnips. We sometimes sow barley, wheat, or rye among the ruta baga for a permanent crop, and cover in the seed when we give the turnips the last dressing with the harrow or horse-hoe. I have seen very good crops of grain after the turnips, and 300 bushels of turnips per acre. In planting Swedes for seed, care should be had that no other plants of the same family be permitted to flower near them, or in the same garden. Other kinds of turnips, cabbage, and radishes, will change the character of the seed; and of course the quality of the roots will be subsequently altered from that of the original. A friend—G. H. Walker, of Hongford, Philadelphia County—who is exceedingly careful in all such matters, promises me to forward you some of the true breed, which you will do me a favor by distributing among our friends on James River, (especially to George E. Harrison and John A. Selden, his brother Miles D. Selden, and Hill Carter, Esqs.)

In your climate, except in very severe winters, like the last, you have the advantage of being able to leave the turnips in the field, to be pulled as they are wanted for use. Here we are obliged by the severity of the season, to pull and top them by the middle of November, and to hoard them away in cellars or caves, where they sometimes heat, and require much handling.

You can sow later than we do, for the plant is one of a cold climate, and grows rapidly after the first frosts. I am, however, now (June 30,) eating ruta baga raised this spring in my garden by mistake; the seed being sown instead of Savoy cabbage. I find them very palatable.

This turnip bears something the character of the pippin apple, which increases in sweetness and flavor by being kept. When the Swedish turnip is first taken from the ground in autumn, it has a raw, or rank taste, when prepared for the table; but towards the middle of winter, it improves very much. It is now sought after in our markets, often selling for 50 cents per bushel, for the use of the table, in mid-winter and spring.

Its color is a fine rich looking yellow when boiled, and the only objection I know to it is, that during the process of cooking, it gives out an unsavory odor. This is of less importance when the kitchens are separated from the dwelling house.

J. H. GIBBON.

Philadelphia County, 2nd July, 1835.

A REJOINDER TO MR. JOHN A. SELDEN'S DEFENCE OF THE NEW FOUR-FIELD SYSTEM.

To the Editor of the Farmers' Register.

Brandon, July 2d, 1835.

It was alike foreign from my intention and wish to appear again in the Farmers' Register on the subject of the new four-field system. Nor from this course would I now deviate, but for some remarks to be found in a communication from the pen of my worthy friend, Mr. John A. Selden of Westover, (which made its appearance in the regular number of the Register for the last month,) that seem to require some notice from me, however cursory, in justification of myself. At the same time I shall endeavor to show that some of the objections to this system are not altogether so trivial, and without foundation, as my friend would fain make appear in his elaborate defence of his favorite system. Still I cannot, and will not deny, that it possesses some great advantages; sufficiently great, perhaps, more than to counterbalance, in the opinions of many, the objections that may be fairly urged against it, allowing them their full weight. My confidence in my own opinions, on any subject, certainly has not increased as my life advances, and it is well known to me that some things succeed much better in practice than could be expected from an abstract consideration of all the arguments *pro* and *con*. Nor must it be forgotten, that this system comes strongly recommended to us by two of the most skilful cultivators of the soil in eastern Virginia, my friends of Shirley and Westover.

My friend Mr. S. says that I charged him with imprudence in recommending his system; and surely this is rather a hasty assumption, as any body may see (page 464, Vol. II. of the Register) by referring to the passage from which he infers the charge. I there state the difficulties to be overcome by each individual, in fixing on the best system; and then ask, if it is not imprudent to recommend any system for universal adoption? I then endeavor to show that no system can be suited to all situations and all soils; but that the rotation must be varied to suit the peculiar circumstances of each case. Now Mr. S. must have meant to recommend his system universally, or not; and as such was not his intention, the remark cannot apply to him; and if he had intended it (which he tells us he did not,) the truth of the remark must be evident to all. Besides, the proposition is general, and applies with equal force to all systems; and there is undeniably a great difference between this and the naked affirmation that Mr. S. had been guilty of imprudence. I even gave the example of Arator's four-field system, than which I know of no one more susceptible of profitable general adoption, to show that even that system will not answer in every case.

After commending the four-field system of Arator in deservedly high terms, Mr. S. descants on the frailty of human nature, which has prevented the more general adoption of it; and the passage in question might perhaps be misconstrued by one who did not know him, into a charge of unworthy motives against those who have had the temerity to disapprove of his favorite system. I am unwilling, however, to believe that such was his intention. When Mr. S. denounced in the strongest terms the disastrous three-field system (as he called it,) he surely must have expected that those who practice and approve that system, would say what they could in its favor. The wonder was not that I at length took up my pen in its defence, but that I had not long before been saved the trouble by some one of the many whose opinions coincide with mine, and who are so much better qualified to do justice to the subject.

My friend asks, if it is generous and consistent to adopt a system and then denounce it? Now I mentioned that I had adopted this system on a farm that had become foul under a lenient course of management, and that I did not expect to continue it longer than for a single round of crops. Surely the most scourging system might be resorted to for the purpose of cleansing foul land, and would, doubtless, be found the most efficacious. I said too, that I had a light field, exclusively devoted to corn, which furnishes a sufficient hoe crop; thereby removing an important objection to the system. If all this had been stated by Mr. S. his question would have been sufficiently answered without a single additional word from me. There are, however, other strong reasons why this system might answer on the farm in question, and not generally on lands bordering on the river. In the first place, this farm is better naturally, than the ordinary river land, though, perhaps, inferior to some favored spots; better for instance than an adjoining farm which I cultivate in three-fields. I believe too, that it is known to Mr. S. that I use lime quite extensively, by the means of which the crop of clover is ensured, and the land otherwise improved. Besides all this, the teams from the adjoining farm (cultivated in three-fields) aid in preparing the fallowed land, giving me a double force for that purpose. Surely these might be considered sufficient reasons, even for continuing this system here, when at the same time it might be thought too severe and too expensive for general adoption on the river. It must be recollected too, that my hostility to the system is not utterly uncompromising. On the contrary, I admitted that, under certain circumstances, I might myself pursue it. Allow me here to add, that I will endeavor to give this system a fair trial, and if it should fulfil any thing like the promise Mr. S. makes for it, shall certainly not be so blind-ed to my own interest, by pride of opinion, as not to persevere in it—or to the interest of others, as not to recommend it to them.

In arguing against the general adoption of this system, it must not be overlooked that so enlightened and so judicious a gentleman as Mr. John Wickham, on land too, of much better than ordinary quality, should, after having tried, condemn it. As much as his opinions are worth on all subjects, they seem to me to be at least doubled in value, when founded on experience.

Mr. S. thinks the number of horses or mules, necessary to cultivate a farm in three or four fields, equal; and states the number at 12 for 400 acres. This puts the subject in somewhat a tangible shape. In the latter part of his communication too, he gives the force employed in cultivating the Curle's estate in four fields, and states the number at 40 mules and 50 hands.

Now I leave it to all the gentlemen who practise the three-field system, to say, whether there is a single instance known to any one of them, in which, on a well managed farm under that system, the number of horses or mules is so great in proportion to the arable surface in the one case, or to the number of laborers in the other.

Perhaps I might be excused for having presumed on the authority of Mr. S. that a much larger number than 12 for 400 acres, is necessary under the new system; for in his first communication (in page 323 Vol. I. of the Register,) he tells us that he then worked at Westover, 11 horses, 14 hands, some inefficient ones among them, and but few oxen; and that these numbers should be nearly doubled to give a just exhibition of the four-field system. Now Westover contains 400 acres of arable land. Let me not, however, be understood as disapproving of an adequate team; but eight to a farm of 400 acres, under the three-field system, I should consider an ample allowance—more I am sure than are generally found on a farm of that extent.

It is difficult to imagine, when the proportion of horses and hands is as 40 to 50, that there will not be a good many of the former idle at many seasons of the year, when manual labor is required to be performed. Mr. S. says that under the three-field system, the horses are idle from the time the crop of corn is laid by till seed time; and elsewhere tells us that this is the critical time to plough under clover to improve the land, and also urges as an objection to the three-field system, that the corn land can very rarely be broken up in time. Now can any thing be imagined more easy than to give these idle animals employment by turning in a heavy growth of clover for corn; thereby avoiding all danger from the worm the ensuing spring, obviating at the same time, the objection to the three-field system, urged by Mr. S.; and by diminishing the labor to be performed the next winter, more time will then be afforded for collecting materials for manure. There are unquestionably some farms under this system, on which clover is grown to considerable extent without being depastured; and allow me to add, that the farm cultivated by me in three-fields, affords at this time ample evidence of the fact. There can be no reason why it should not succeed under this system on all land able to produce it; nor why it should be grazed off sooner than under any other system. If it were impracticable, or even difficult to succeed with the clover husbandry under the three-field course, I should be one of the first to abandon it; for I am endeavoring to improve my land extensively by the use of that valuable grass. Mr. S. says that the best clover does not grow on the best land. My best has certainly grown after lime and manure. Indeed, without the previous use of lime, the clover hardly pays me for the seeding; but in a few years we hope to have the whole arable surface here improved in that way, having already more than half accomplished it.

There is one argument in favor of the four-field system, which seems to have been overlooked by its advocates, and which it may not be amiss to advert to in this place. The scantiness of the second crop of wheat in the rotation is very favorable to clover, by sheltering the young plants without endangering their existence by suffocation, as is sometimes the case when the crop is heavy. In this point of view, I must acknowledge its decided superiority over the three-field system. If the crop of corn, succeeding wheat, made on a clover fallow, is as much benefited by the decayed grass, as Mr. S. contends, why would not wheat after corn, made on clover, (as under the three-field system) receive equal benefit?

Mr. S. labors to prove the superiority of wheat, as a crop, over corn. Whether he has succeeded, it must be for others to determine, and experience will be their best guide. It is certain that many of my notions are erroneous, and I am far from wishing that any opinion of mine should be practically adopted by a single individual, unless sanctioned and confirmed by his own experience and observation. With me, the crop of corn, estimating what is consumed at home at the price the remainder sells for, has been much the most profitable, and far more certain, however more variable the price may be. In the last two years, for instance, the gross crop of corn has been much the most valuable, although made on less land, after deducting $360 for *shorts*, each year. I will add that the quantity delivered this year exceeded the delivery of any previous year by 180 bbls. and that the moiety of it was sold from the farm under the abominable three-field system, although no more expense was incurred for shorts than for the last five years.

Admitting that as much corn can be made per acre under this, as under the three-field system, and that no more would be consumed, (and I am as far as ever from admitting either proposition—) as there would be one-fourth less land cultivated in corn, the gross crop would be diminished one-fourth, and as one-half of all made under the best management is usually consumed at home (even under the three-field system,) the quantity for sale would, of course, be reduced one-half.

On good corn lands that crop is not unfrequently the most profitable when shortest, (paradoxical as it may appear;) and the reverse of this is generally true with regard to the wheat crop. The reason is that the demand for the former is local, and the price is accordingly more affected by a partial failure.

Mr. S. rates his loss from shocking out his corn one year at nearly a sixth of the whole. Now we are in the habit of putting all our corn in shocks, in order to expedite the seeding of wheat, and a portion of it frequently remains out till January, and yet we have never sustained any considerable loss from the practice that I know of; and I can in no wise account for so great a loss, but by supposing some defect in the corn itself. When the corn is perfectly made, and not prematurely cut down, I am confident that my loss does not exceed two per cent. from exposure in the shocks.

We are told that land which will produce four barrels of corn, may be relied on to give twenty bushels of wheat on good clover fallow, well prepared, and seeded; and that 25 or 30 bushels may be expected under like circumstances, from such as will yield eight barrels per acre. In this part of the state, my opinion is that land that would bring four barrels of corn, will not generally, without the use of calcareous manures, bring good clover at all. It might be asked, too, if the land be equally well adapted to both crops, why the ratio of increase is not more nearly equal? I have always thought that there is no land, except perhaps pipe clay, to be found in this part of Virginia, that will yield as many bushels of wheat as of corn, which Mr. S's. first proposition assumes.

Under the four-field system there is only one-ninth more in cultivation than under the three, and admitting that the crops are equally heavy, (which is going far enough in all conscience,) there would be only one-ninth more offal to convert into manure. What becomes then of the superiority of the new system in this respect? For if there is one-ninth more manure made and applied, there is also one-ninth more land in cultivation, and that ninth is moreover deprived of the advantage of clover. I am willing to admit that the manure made from wheat straw is somewhat superior to that produced from the offal of corn.

The crop of corn made by Mr. S.'s predecessor at Westover, was but seven barrels per acre, though with very imperfect cultivation. Only a small part of the crop followed clover, as that gentleman informs me, and of course any calculation, based on the supposition that the whole had that advantage, can prove nothing.

Does Mr. S. regard as inconsiderable the expense incurred annually by wheat growers in seed? If I were at all happy at numbers, it would give me pleasure to calculate, as nearly as possible, the cost to the state of Virginia every year of this single article. It must be a pretty round sum, as one-tenth or more of all the wheat made in the state is reserved for the purpose; and from the noise made about the tythes in Great Britain, this would seem to be something considerable.

As I have crossed the Atlantic, I will now try to fortify the objection against the new system, derived from the universal practice of the best English farmers, which Mr. S. regards so lightly. He tells us that he does not read books on English agriculture, but knows there may be a great difference between the soil and climate there and here. This no one will deny, but I take it, the difference is decidedly against us, except that we can here cultivate that noble plant Indian corn, about the value of which Mr. S. and I seem to differ so widely. The climate there is very humid, and is accordingly admirably suited to grass, as well as small grain, which is partially protected from many casualties, to which it is liable here, by the coolness and equability of the temperature. In such a climate, one would suppose that severer culture might be admissible, than in a comparatively arid and variable one like ours. Allow me to advert, too, to the great abundance of lime and other manures, foreign and domestic, which are used there, and to the skill with which they are applied. Now if in such a country, with an overflowing population, where land is high and rents of course correspondingly so, labor is very low, and produce hardly ever fails to command a good price; three grain crops in succession are found to make too great a draught upon the fertility of the soil to be profitable; it would seem to follow *a fortiori* that they cannot answer here—where the reverse of all this is true. It is considered there an established rule, founded on long experience and profound observation, that the more rarely any crop occurs in a rotation, the heavier it will be found to be; and the reason is, that the specific food of the plants constituting the crop, will there be found in sufficient quantities in the soil to nourish them to perfection.

In answering this objection, my friend Mr. S. says that the corn crop, a summer and hoe crop, intervening between the two crops of wheat, prepares the earth with a pabulum the better suited to the last crop of wheat. I can very readily conceive that the corn crop will diminish the pabulum that the succeeding crop of wheat ought to find in the soil; but can in no way discover how it can add to the quantity, until the plants themselves revert to the earth in the shape of manure.

Mr. S. accuses me of inconsistency for approving the five-field system, and objecting to the new system, that it gives too little corn for sale. With regard to the farm on which I practised this system myself, I always had a sufficient corn crop; having a light field cultivated altogether in corn. We have, too, a large marsh, which answers for a standing pasture. As for my recommendation of it to others, it was only conditional, (as any body may see by referring to the passage,) viz: when the fallow system has already been determined upon; and I assigned as a reason why I should prefer it to the new system, that, as at least one-fifth of the farm would be required as a standing pasture, the same surface would be in cultivation, and the worst feature of the new system, the three successive grain crops, would be avoided. I never thought, and no where said that it was free from all the objections that may be urged against the new system. Indeed the fair inference from what I did say is, that I considered both systems liable to the same objections, with the very important exception above mentioned.

It is a little remarkable that Mr. S. in his account of the improvement at Woods' farm, (in page 324 Vol. I, of the Register,) where the crop was astonishingly increased, should inform us that this great improvement was effected without a standing pasture, and the cattle, of course, deriving their sustenance from the clover field, (as he expressly says,) and only one-fourth of the farm in clover; and should yet think it other than an improving system to have two-fifths in clover, with no greater disadvantage on the score of pasture land, and without the excessive draught upon the soil from three successive grain crops. In other words, Mr. S. would seem to think it better (other things being equal, for there is no standing pasture in either case,) to have one-fourth than two-fifths in clover, and three-fourths than three-fifths in cultivation, on the score of improvement.

The crops of wheat made by Mr. S. at Westover, have been certainly very flattering: but in accounting for them, he seems to me to overrate the merits of the system, and to underrate the natural fertility of his land, and his own excellent management, which would doubtless insure success under any system. As these crops have been produced as evidence of the excellence of the new system, it seems that the following remarks are certainly pertinent, and perhaps necessary to a proper understanding of the subject.

The crop of wheat made by Mr. S.'s predecessor at Westover, is by no means to be considered as a fair criterion of the productiveness of the land; for, as that gentleman informs me, it was all sown after the 10th of November, (the period assigned by Mr. S. and all other good farmers, as the proper one for finishing that operation in this climate,) by the force from another estate, where a full crop had been previously sown; and in addition to this, the season was extremely unpropitious for wheat—the crops in this neck being of such inferior quality, as to require a deduction from the price originally agreed on. Mr. S. is mistaken, too, (unintentionally I am perfectly sure,) in regard to the amount of that crop, which was larger than stated by Mr. S., and produced from less land; a portion of the former having been reserved, and removed elsewhere for seed, without the knowledge, it is presumed, of Mr. S.'s informant, and twenty acres of excellent land (as nearly as it could be estimated,) having been left out, in consequence of the advanced state of the season; it being then about the middle of December. These facts I have from Mr. S.'s predecessor.

As far back as 1816, 3100 bushels of wheat and 600 barrels of corn were made at Westover by my kinsman, Benjamin Harrison, Esq. of Berkley, after the estate had been long subjected to the most exhausting course. If I mistake not, and if I do I hope to be put right, Mr. S.'s own great crop of 3000 bushels from 100 acres, was made on land on which he had put little or no other improvement than clover and plaster, and what was obtained by a masterly preparation for the crop. By a reference to his exhibit of his crops, (see page 322 Vol. I, of the Register,) and to what follows, it will be seen that this field was never cultivated by him in corn till 1833; and as he tells us he applies nearly all his manure for corn, it is to be inferred, that this field at that time (1832) had received little or no manure. I wish if any one of your subscribers has the good fortune to cultivate as fine land in three fields, that he would furnish the data which Mr. S. complains so much that he wants. I cannot help thinking, if he is a good manager, that his exhibit will show more than 5 barrels of corn, and 12 bushels of wheat per acre.

I never for a moment supposed that Mr. S. was acquainted with the fact that Mr. Harding was the first to practise the new system, when he attributed the honor of having introduced it to Mr. James Selden. On the contrary, I am quite certain that Mr. James Selden adopted it himself, without any previous knowledge of the fact. Mr. S. says that Mr. H. kept at Dover as many as 50 or 60 cows, and derived a considerable part of his profits from stock: and if so, the exhausted condition in which he left the estate, is certainly not fairly chargeable upon the four-field system. Mr. S. says too, that Mr. H. improved very highly the farm to which he removed, and where he continued to practice that system till his death. I can only say in reply, that all his neighbors were not unanimous in regard to that improvement.

By way of illustrating the advantages of this system, my friend Mr. S. refers triumphantly to the result of the last year's cropping at Curle's. It is to be regretted that it had not suited his purpose equally well to give us the average sales from the estate, since it was purchased by the late Col. Wm. Allen, instead of referring to the results of the last year's crop, which greatly exceeded an average, and can of course prove nothing. If I mistake not, the crop of wheat of the last year exceeded, by at least a fourth or more, the average crop made on the estate since the purchase; and if so, (if I am wrong I hope to be corrected,) and if even then the crop was only 13 bushels per acre, as Mr. S. has informed us in the number of the Register for November last—this deduction of one-fourth, would, you perceive, reduce the average per acre to a very moderate one for uncommonly fine land.

It happens that an estate adjoining me was offered in even exchange for Curle's a few years ago, and the offer refused by Col. A. It would give me pleasure to present a comparative estimate of the crops made on this and that estate for the last, and several previous years; but I am prevented from doing so by the repugnance expressed by the proprietor, to such an obtrusion of his private concerns before the public.* Without entering into minute details, I will, however, take it upon myself to say, that the sales from this estate, for two out of the last three years, have exceeded the largest sum assigned by Mr. S. to Curle's, for the last very favorable year. It is proper to observe, that this estate has the aid of a small grist mill, and usually about $400 worth of wheat offal, but never more; but these advantages, it is believed, are more than counterbalanced by the pork raised and fattened on the estate, (none of which it appears is raised at Curle's,) by the support of a large and expensive establishment, and of a black population, the extent and inefficient character of which may be inferred from the fact of their being, at the last enumeration, 50 children under the working age. The despised corn crop of the last year, has, with the above aids, after supplying the heavy demands upon it, furnished a surplus for sale of more than 1500 barrels. On this estate, which is under an irregular but very improving course of cultivation, some fallowing is done, more than a fourth of the land is suffered to rest, and corn is largely aimed at as a sale crop. There are

*It is strange that any such statement as is here referred to, and which every reader would agree with our correspondent in deeming interesting and useful, should be considered as an "obtrusion of private concerns" on the public notice. If such was the view taken by all of those who are, or may be, contributors to this journal, it would soon lose its most valuable features. There would be presented no more authenticated facts and practical proofs—and the want of these could not be compensated by mere general and intangible statements and theoretical views, no matter how true, and though as ably maintained as so unsatisfactory a course would permit.—Ed. Farm. Reg.

more hands (I do not know that the physical force is greater,) and fewer horses than at Curle's, and great use is made of that valuable animal the ox.

Mr. S. says that from $1000 to $3000 worth of corn has been regularly sold from Curle's each year. Now when we consider the extent and fertility of that fine estate, and that all the pork used upon it is purchased, this is astonishingly little to be derived from that crop.

In conclusion I must say that, although on the very best lands, and with the very best management, the new system may answer very well, and I cannot doubt that it will; yet on ordinary land, with ordinary management, I am very far from thinking that it will ever be found to succeed. If I have not been misinformed, I believe that you, sir, have tried this system, and I am sure that many of your subscribers, myself among the number, will be both edified and gratified, if you will afford us the light, which you are so well qualified, by experience and otherwise, to throw upon the subject.*

I will now remark, that it has been my object to discuss this subject fairly and freely, but without saying a single word otherwise than respectful and kind; and I hope that my friend Mr. S. will receive what I have written in the same spirit of perfect kindness and good will, in which it emanates from me.

WM. B. HARRISON.

From the New York Farmer.

HOPS.

The opinions of intelligent and practical men, or rather the results of their own actual experiments, are of great value. This applies particularly to small farmers, whose operations, being on a limited scale, receive their immediate personal attention. In looking at such results, however; those who farm on a large scale are liable to be led into error in expecting that the same will follow an extended cultivation, forgetting that the success is in many cases mainly to be ascribed to this minute personal attention, stimulated and strengthened by self-interest. In extended concerns, that attention cannot always be given; and as much hired labor is employed, the powerful motives of interest do not operate. The large and enterprising farmer, therefore, must take this into consideration; as his concerns extend themselves, his risks are multiplied: and if the results of his cultivation are not proportionately correspondent to those of the small farmer, he must often place it to the account of circumstances absolutely beyond his control. Nothing valuable in this world is accomplished without perseverance, labor, fidelity, and attention. This is one of the wise provisions in the constitution of things; one of the benificent laws of a righteous Providence. On the other hand, labor, perseverance, fidelity, and attention, seldom fail, in ordinary circumstances, of reasonable success. The business of the farmer particularly demands his attention, and his ill fortune may be but too often traced to neglect, to this want of personal attention, to the division of his care among other pursuits, or to a miscalculation in extending his operations beyond his power of immediate and careful superintendence. These remarks often occur to me in my visits among our small farmers, with whom I have been much in the habit of familiar, agreeable, and instructive intercourse; whose affairs are managed under their own immediate and constant personal attention, and among whom I often meet, with the highest pleasure, with examples in a small way of eminent success. I have been long accustomed to note the observations of such men, and to gather and record any facts which they have been kind enough to communicate, where I knew I could rely upon the correctness of their statements. I now send you some information, obtained in this way, in relation to the cultivation of hops by two farmers, who cultivate a small farm in partnership, in a town in Vermont, on the Connecticut river.

Messrs. D. & H., in 1833, from four acres obtained 3000 pounds, which sold for 20 cents per pound. In 1834, from five and one-half acres they obtained 4000 pounds, which sold for 15 cents per pound. In 1833 they judged that their land, after deducting all expenses, yielded an income of $100 per acre.

Hops are planted eight feet apart in hills. The cuttings are planted, and Indian corn is cultivated among them the first year, about half as thick as when planted by itself. The corn and hops are hoed at the same time. The second year the hops are polled and a crop gathered.

Green barn manure is thought to be injurious to the vines. Fall manure, or compost, is deemed best. The hills are opened in the spring; the vines are then trimmed, the ground loosened, and the manure applied to the hill. The field must be kept clean of weeds. The hops are gathered by hand. Women are employed in the picking at 20 cents per day. They require to be kiln-dried immediately, as they are very liable to be injured by heating in the heap. From 45 to 75 lbs. are kiln-dried at a time, and the process of drying occupies about 12 hours. After drying they are put into a heap and suffered to sweat a little, and then conveyed to be packed and bagged, which is done by a screw press. They are packed and screwed for about $5 per ton, and are then sent to market without delay. The manner and condition in which they are put up is of the greatest importance, for if the inspector discovers, on trying the bag, the whole bag is condemned. Spruce poles for hops, about 15 feet high, cost here one cent apiece. Messrs. D. & H. gave 25 cents per one

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*Our personal experience of the new four-shift system is so limited, and the all important part of it, the fallow process, has been so imperfectly executed, that our practice would be worse than worthless, as affording an example for imitation. But they who have committed the greatest errors may be at least trusted to point them out for the avoidance of others—and in that manner only can the results of our experience be of any value. But as imperfect as may be our views on this interesting subject, as they have been called for, they shall be presented at some early time—upon the ground that we hold every reader of, and contributor to this journal to be bound to answer, so far as may be in his power, such inquiries as may be addressed to him by any other reader and contributor.—Ed. Farm. Reg.

hundred and cut them for themselves. They will set this year about 4400.

The market price of hops is very fluctuating, and the risk of curing them well is very considerable, and requires great experience and care. The ordinary yield per acre I am not able to state, as it varies greatly. In some parts of this state they are extensively cultivated; and on land, which, without great attention, would make very small returns. A farmer in Boxborough, Mass., recently from five acres of land gathered 10,000 pounds; and I have been credibly informed that a farmer on the river, about 12 miles above this, the year before the last, received from twelve to fourteen hundred dollars from the sale of his crop of hops. The cultivation, I am persuaded, might be extended to great advantage, as there is little fear that the market will be over supplied. It must not be forgotten, however, that the quality and condition of the article, when sent to market, is of the first importance. Good hops will always command a fair price. Damaged or ill-conditioned hops are worthless.

H. C.

Meadowbanks, May, 1835.

From the Massachusetts Agricultural Repository.

PEACH TREES.

Mr. William Phillips, of Pennsylvania, has derived great benefit from the application of air slacked, old effete lime to peach trees, the effects of which, according to his own account, have been very great. He puts about a peck of lime to each tree; he thinks it useful as a preservative against the insect so fatal to these trees. We have then two applications recommended, unleached ashes and lime, and from our own experience are able to recommend both. We are not sure which has the preference. The lime and ashes should both be dug up every spring. A friend suggests that he killed his young peach trees by lime; caution is needed in the application.

From the Southern Agriculturist.

GENERAL OBSERVATIONS ON THE OLIVE, ORANGE AND DATE TREES GROWING IN GEORGIA—RUTA BAGA TURNIP AS A SECOND CROP AFTER CORN.

St. Simon's, (Georgia,) June 17, 1835.

I am unable to excuse myself for not sooner replying to your esteemed letter of the 15th of January. I did intend writing you something on such matters, as had come under my observation, particularly respecting the olive, orange, and dates. The frost of February has destroyed those trees, leaving nothing but stumps and wrecks behind. I shall, however, still make some observations:—

I had a very pretty grove of 200 olives, imported about 10 years since, their stems from 8 to 12 inches diameter, and, perhaps, averaging 20 to 25 feet high to the top; they have borne fruit for some years. I had also near 600 trees, or plants, from 11 to 5 years old. From comparisons between the olive and orange, in previous severe frosts, where the orange was much hurt, the olive was uninjured. I have, therefore, no hesitation in believing the olive is well adapted to, and will succeed on our sea-coast, of both Carolina and Georgia.

I have been personally acquainted with sour-orange trees, both on St. Simon's and Jekyl, for 58 years, and believe they were planted near 100 years since; and have never been killed by frost until last February. when they were all destroyed. I therefore, conclude, that since the first settlement of Georgia, the olive would have succeeded. It occurs to me, that notwithstanding the present immense value of the olive in France, they have been cut down in some severe frosts.

The olive and orange seemed so completely destroyed, even to some depth under ground, that I cut them down, and planted corn in their place; on examination about a month since, the lower roots still appeared fresh, I concluded that opening the ground around them might encourage vegetation; and have now the satisfaction to see the olives pushing out abundance of fine strong shoots, not one failing. The oranges are doing the same, though some appear dead, not yet decided; by returning the earth to the olive shoots, they will throw out roots, and furnish fine plants. In fact, I am better satisfied respecting the success of the olive than I was before the severe frost.

I had little hopes of any date trees surviving—some appear certainly gone, others are sprouting from the roots, some from the tops; a few put out blossoms—so I close the list of my misfortunes in that way.

I like to have some hobby in the agricultural line—my present is, raising ruta baga, a double crop after corn. In prudence I should wait another year's experience, but as the season advances, I shall relate what I do know. Every horticulturist in the southern states must have his mortification, after preparing land, to find his seed bad; indeed, he is quite an honest seedsman, that only mixes three-fourths of bad, to one of good seed. I have seldom ever been so fortunate. Accident threw in my way an advertisement of *William Cobbett, No.* 11, *Boltcourt, Fleet-Street, London*, offering warranted seeds for sale, of his own raising, particularly ruta baga seed, warranted, at the following rates, if 25wt. price 9d. str. per pound, if 50wt. 8d., if 100wt. 6d. I got some of his seeds last year, all good: and have some arrived this year. These particulars I mention for the benefit of those who may attempt the culture of turnips or other articles.

Mr. Cobbett sends his seeds to any place (cash first paid;) mine were sent to Liverpool, expense trifling, and there put up in an air-tight tin canister, sufficient to hold half barrel of flour, expense 5s. 11d. But to the turnips.

My corn, as usual, in rows five feet apart, land well ploughed in the spring by oxen, and entirely attended during summer by a small cultivator harrow of three teeth, and a light mule—no bed to the corn. In all August and September, say to the 15th of September, I consider the season in our sea-islands—the corn was stript of their leaves, and tops cut, a furrow was drawn between the rows with a shovel plough, and two bushel baskets of manure, dropt into each task row; a furrow on each side with a bar-share, covered the manure, and made a small bed; the top being levelled with a hoe, draw a small trench, two inches wide, one deep, and therein, at every 10 inches, drop five or six seeds.

Such particular and good directions are given in William Cobbett's Year in America, also inserted in the Baltimore American Farmer, 1st volume, that I refer to it; as soon as convenient pull up the corn-stalks, and throw the earth on each side to the turnip bed; the rows will of course be five feet apart, but where land is plenty, this is an advantage. If there was no corn I should not plant ruta baga at a less distance than four feet. The following spring plant corn in the turnip bed; it will receive the benefit of the manure. I am convinced land this way will be much improved and produce double crops; the last crop (turnips) more valuable than the corn.

I planted eight acres this way last year; the season was dry, and my people awkward: the seed though good, came up badly, from drought and bad planting; my ruta baga being exhausted I filled up with Norfolk turnip; crop hardly set till late in September. Turnips, as Cobbett says, are poor watery things, compared with ruta baga, and so they are; yet, quite beneficial to cattle fed on dry food. Most of my field consisted of Norfolk turnip, and I commenced on them, reserving the ruta baga till the last, having many oxen; I regularly fed, during December and January, 30 bushels of turnips per day, chopped up raw, and found much advantage.

My allowance of ruta baga, was five bushels per day, which was boiled, for experiment. I fed two horses one month thereon, without grain, only rice-straw; I never saw horses thrive better. Some sheep were fed on boiled ruta baga, raw Norfolk turnip and cotton seed; I never saw fatter mutton. Poultry requires no better food. My negroes had free access to the turnip patch. I preferred the ruta baga; seldom eating a meal without a plenty. When the frost happened in February, the Norfolk turnip was entirely destroyed, and though the ruta baga were frozen, after being thawed, they remained good. My present crop of corn, planted in the last year's turnip beds, looks very well.

I am respectfully, dear sir,

Your most obedient servant,

JOHN COUPER.

From the Southern Agriculturist

OBSERVATIONS ON THE STINK-WEED, (CASSIA OCCIDENTALIS) RECENTLY TERMED THE FLORIDA COFFEE.

St. Helena, June 15, 1835.

Dear Sir—In the last number of the *Southern Agriculturist*, I see a short article upon the Florida coffee. The writer is perfectly correct in saying that it is nothing more than a useless weed, which grows here abundantly, but he has mistaken the name, supposing him to have purchased the same kind of seed that I did. He calls it the horse indigo, *(Babtisia tinctoria,)* the *Sophora tinctoria* of Linnæus. This plant is delineated in Prof. Rafinesque's Medical Flora. The plant which I have hatched on the contrary, is the *Cassia occidentalis*, or Styptic-weed, or as it is very significantly termed in a note to the communication, stink-weed. It grows more abundantly in the town of Beaufort, than any other locality with which I am acquainted. It may be that Florida beats it in this respect, but if they can send all their seed elsewhere, they will be getting rid of a nuisance, and make a handsome profit into the bargain, if the seed maintains its original price. So great was its abundance in the vacant lots in the town of Beaufort, and so offensive its smell, that the inhabitants of that town, in the year 1817, when the bilious fever prevailed to an alarming and deadly extent, conceived the impression that the cause might be owing to this loathsome weed, or at least contributed to by it. They, therefore, had them cut up in all parts of the town, but unfortunately neglected removing them. The consequence was, that they became still more offensive. Since then, they have every year cut them down when working the streets, and "thrown them like the loathsome weed away." It is frequently used there as a styptic to fresh cuts, and I have been informed is considered useful for that purpose, but never having tried it myself, cannot say what its properties are in this respect.

I saw some of the prepared coffee in its powdered or ground state, and it had the appearance and the smell of coffee, but not its peculiar aroma. Indeed, there are a thousand things which when charred and ground, will deceive many persons. The rye thus prepared is used extensively in the northern states, in the interior, that with long sweetening (molasses) in contradistinction to short, (sugar) forms the principal morning beverage. In Germany, Chiccory is used either alone or combined with coffee, and this not at all confined to the poorer classes, but by many who consider it as giving an additional flavor to the coffee. So, also, in many parts, the roots of the Dandilion, (*Leontodon taraxacum*) is prepared and used in like manner. Indeed, as they are now applying India rubber to so many purposes, I would not be at all surprised if some one should advertise Caoutchouc coffee, as it has already been converted into bread, it can certainly be burnt into an imitation or substitute for coffee; and the same may be said of deal-boards, to all those who may choose to deal in such substitutes, when the *genu-ine* article, as our northern brethern can assure us, can be procured at a much cheaper rate.

Respectfully, yours,

CHARLES WM. CAPERS, M. D.

From the Southern Agriculturist.

IRRIGATION OF GARDENS.

"In the south of Spain, no garden is formed but in a situation where it can be irrigated; and the water for this purpose is drawn from deep wells by what is called a noria, viz., a kind of water wheel, which is described and figured in *Loudon's Encyc. of Agr.* The ground is laid out in small squares, separated by channels for conveying the water. Each square is a level panel, sunk a few inches below the water channel; and at one angle of each panel is a small opening in its bank or border for the admission of the water. On the margin of the squares, garlic is commonly planted. The olive is raised from truncheons of 8 feet to 10 feet in length, and from two inches to three inches in diameter. They are sunk about four feet or five feet into the ground; and the part of the truncheon above ground is covered, during the first summer, with a cone of earth or clay, to the height of from two feet to three feet, doubtless to prevent the sun from drying up the sap of the truncheon. Vines, in some places, are trained with single stems to the height of two feet or three feet, and then allowed to branch out like gooseberry bushes: they are manured with recent stable dung when it can be got, and the fruit is never found to be injured by it."—*Busby's Journal.*

Colonel Pinckney's house in Pendleton, is at the top of a hill, of about 70 feet elevation, and is at 800 feet, measured superficially, from a spring, which gushes out at the foot of the hill. The rivulet, or as we call it, springbranch, falls over one or two rocks at a little distance, but as the quantity of water is small, it is kept back by a little dam furnished with a floodgate self-acting, by means of a float, which lifts the gate as soon as a sufficient head of water is accumulated to act advantageously. The water falls upon a small wheel which sets in operation Hubbard's patent forcing pump; and the spring water is carried through leaden pipes, 18 inches under ground to the top of the hill, and is discharged in the kitchen; from which the surplus is conducted, by proper channels, from level to level, through the garden, on the hill side.

This example ought to be contageous, the only doubt of its utility lies in the use of leaden pipes; the proprietor considers the constant use of them as a sufficient security against the poisonous influence of the lead, but we know that lately objections have been made to the salubrity of the water conducted into the town of Mobile, through leaden pipes, notwithstanding their constant use; and the Messrs. Fabers, with several workmen, at their country seat, on Pon Pon river, have just recovered from very formidable and repeated spasmodic attacks, brought on by the use of water forced by one of these ingenious contrivances, through leaden pipes from their spring into their buildings. The use of wooden pipes or small iron castings would be free from any risk.

The precautions taken to supply abundant moisture to the cuttings of olive, show the cause of the failure to propagate the olive by cuttings in this country. In this city and at Mr. John Couper's, on St. Simon's Island, cuttings have been made to germinate, but after putting forth, the leaves perish and the cuttings become a dry stick under our sun. It is far easier for us to propagate the olive by seedlings, according to Mr. Mey's practice, described in the 6th vol. page 308, and confirmed in page 250, and in vol. 3, page 230 of the Southern Agriculturist—*Conductor of Southern Agriculturist.*

From the Ohio Farmer.

PROTECTION TO SHEEP.

Clarke Co., Ky. May 19, 1835.

It is known to those who have tried the experiment, that sheep put into the same enclosure with cattle that are in good order or cows having with them young calves, are completely protected by them, from the attacks of dogs; and I believe they would also be protected from the attacks of wolves, though of this last I have no experience, the wolves having been exterminated from this section long since.

These remarks are made in reference to the large breed of cattle we have in this county; but it is believed that any cattle that are tolerably fat, will show the same dislike to the dog.

S. D. MARTIN.

From the Petersburg Intelligencer.

MATOACA MANUFACTURING COMPANY.

We had the pleasure, a few days since, of visiting the works of this company, situated on the north bank of the Appomattox about four miles from Petersburg, and were no less gratified by the beauty and substantial appearance of the buildings than surprised at the expedition with which they have been erected. They consist of two cotton mills, three stories high, a machine shop and sizing house, built of granite of a superior quality, obtained from a quarry on the company's land. The principal mill is 118 feet long by 44 feet wide; the other 90 feet long by 40 feet wide. They will contain about 4000 spindles and 170 looms, a large portion of which have been set up and ready for use.

In addition to these buildings, the company have erected a granite house for a store, and fifteen or twenty frame tenements, as residences for the workmen, each to contain two families: and preparations have been made to erect as many more as the establishment may require. When the whole shall be completed, and the mills in full operation, it is estimated that Matoaca will contain between 400 and 500 inhabitants. It had already assumed the appearance of a village, and will, in a short time vie with any manufacturing establishment in the country for beauty of situation, the substantial construction of its buildings, and the care and attention bestowed on the comfortable accommodation of the workmen.

It is expected to put the works in operation early in the next month, and we understand that it is the intention of the company to manufacture all the cotton spun in their mills into cloth.

Matoaca furnishes another gratifying evidence of the enterprise of our fellow citizens, and of the increasing prosperity of Petersburg. We have now (in addition to the several well known flour mills) five cotton, and two cotton seed oil mills; and there remains a large unemployed water power on the Appomattox.

From the Farmer and Gardener.

IMPORTANT EXPERIMENT IN POTATO CUTTINGS.

Mr. Roberts—It being desirable among cultivators to produce early vegetables, I take the liberty of noticing through your journal, an experiment on the potato crop, which may possibly be found useful to your subscibers, and cause our markets to be supplied with new potatoes about two weeks earlier than is customary, besides enabling those who plant them to prevent the ragged and uneven appearance which potato crops too generally present when coming up. In order to have a full and satisfactory trial, I caused a large square of ground to be prepared in my garden, and laid it out in four long beds, all well manured. In one of these beds I planted the top or crown of the potatoes, (mercer) in the next, the sides, and in the two last, the crowns and sides promiscuously. The crowns are all up about eight inches high, and look very flourishing. On examining the bed in which the sides were planted I find them just sprouting, being but about one inch from the bulb, the surface of the ground having no appearance of vegetation whatever. The other two beds have come up as they were planted, promiscuously, presenting a very rough and uneven appearance, while some are eight inches high, others have not made their way through the earth. This patch was planted on the 18th June, and I mention the facts thus far developed, to encourage others to make more careful experiments, on more extensive scales, and to excite a spirit of inquiry: satisfied that we agriculturists have much to learn yet.

S.

July 9, 1835.

From the Farmer and Gardener.

ON THE MANAGEMENT OF ARTIFICIAL GRASSES.

Clairmont, 6*th Month* 20, 1835.

Edward P. Roberts,

Respected Friend—I have received thy letter of the 13th inst., containing 12 queries relative to the culture and suitableness of the most approved species of grasses, for dairy purposes, intended for the information of a gentleman to the south. And while I comply most cheerfully in replying thereto, I hope I shall be excused, at this busy season of the year, for making my answers as concise as possible. I am fully sensible that the subjects to which thou has called my attention, are vitally important, and are entitled to a more minute and extensive notice than I have leisure now to devote to them, but if a plain account of my opinions and practice, will be of any service to our southern subscriber and inquirer, or to others, they are at thy service.

1st Query. Is clover suited to being grazed by cattle, horses, &c.—or is it more profitable to cut it and soil the cattle with it?

In reply to this query, I may observe, that *red clover* is good for grazing cattle; but in order to derive the full benefit of enriching the land by it, the cattle ought not to graze on it until it is nearly or quite in bloom, whereby the droppings of the cattle, are in some degree covered by the clover, and the evaporation of the more valuable portions of the manure, thus to a considerable extent, prevented. The cattle should be taken off early enough in the fall to leave a good cover, to protect the roots of the clover, and prevent their being drawn out by the winter frosts. Clover is now generally known to be the best of all grasses for enriching and improving poor land; it should, therefore, be sown with all the varieties of spear grasses, viz:—orchard grass, timothy, tall meadow-oat, and herds grass, if the latter be sown on dry mellow land.

Although red clover is not the best grass for grazing cattle, yet it is essential to the grazing, as it fertilizes the land, and thereby promotes the growth of white clover and green grass, *poa pratensis*, which are considered as the richest and most acceptable to cattle of all grasses.

Soiling of cattle in the stalls have two good properties in it, viz. cattle thus fed furnish more manure, and require less land to provide the necessary supplies of provender, but these are not gained without additional expense, and great risk to the health of the cattle, which is certain to be impaired more or less, unless they are permitted to range abroad a part of each day.

2d Query. Is lucerne better suited to soiling milch cows than the common red clover; does it yield more green fodder, and is it earlier?

3d Query. Is orchard grass calculated to being grazed by cattle—does it sustain much loss from the treading down of the cattle while feeding?

Answer to the 2d and 3d queries. The cheapest and earliest article for soiling, is, I think, the tall meadow oat grass—*avena elatior*. The *lucerne* is equally early, and as good or better for soiling; but its culture is more difficult and expensive. The red clover soon follows them, and when ready to cut we have no occasion for a better article to soil with. The orchard grass and tall meadow oat, affords the most pasture of any of the spear grasses I am acquainted with, and will make good and suitable hay for cattle if sown thick, and cut when in flower, or rather before; continuing longer in sandy land than most other grasses and bears the trampling of cattle well.

I shall now answer the following of thy questions, under the same general head:

4th Query. Is it considered judicious to sow clover seed and orchard grass seed together to graze upon?

5th Query. Is it considered sound economy to sow the above grasses together for hay? In either case, what are the respective proportions of seed of each that should be sown to the acre?

6th Query. Will the orchard grass mature sufficiently early to be cut with the clover for hay.

7th Query. What quantity of orchard grass when sown alone, should be sown on an acre intended for hay?

8th Query. Should a larger quantity of orchard grass be sown on an acre intended for grazing than on one intended to be cut for hay?

9th Query. Will herds grass bear grazing; and is there much loss resulting from the hoofs of the cattle?

10th Which of all the artificial grasses within your knowledge would you prefer for grazing, and which for soiling?

11th Query. Which of the artificial grasses is the most profitable for hay, regard being had to its nutritious quality, facility of curing, and adaptation as food for cattle?

I am in the regular practice of sowing from five to six quarts of clover seed to the acre, in March, on land that was sowed in the previous fall with orchard grass, or tall meadow oat. They are in flower about the same time and are well calculated to support the clover, and be mowed together. The requisite quantity of orchard grass seed for an acre, depends much on how well it has been cleaned and prepared for sowing. I sow about two bushels when clean, first preparing it as follows:—lay the seed about four inches thick on a floor; make it thoroughly damp by repeatedly watering it well, and care should be taken to turn it frequently. It should remain thus for about 36 hours, which renders the seed heavier, causes it to fall freer from the hand, and enables the sower to distribute it more evenly, it not being from its increased specific gravity so liable to be affected by the wind. Another advantage gained is—it vegetates with much greater certainty.

Herds grass makes good hay for milch cows, being soft and nutritious, but the yield is not equal to other grasses, either for hay or pasture.—It may, however, be sown to profit on cold damp lands, where it thrives better than on dry land, and will grow on land too wet for any of the other grasses enumerated above.

I prefer clover and orchard grass mixed to feed cattle with in hay or pasture: and timothy and clover for horses. Although the clover ripens earlier than the timothy; yet if cut when in bloom, they make a better hay than either do separately. Owing to the astringent quality of the timothy, horses fed alone on it constantly, become costive, if not feverish, and sometimes both; these being the necessary consequences of such a condition of the bowels, when long continued. This injurious and natural tendency of the timothy, is corrected by the clover; its admixture therefore with the latter is absolutely necessary to the preservation of the health of horses. Should some of the clover when mowed with the timothy be so ripe as to crumble on making it into hay, it should not be considered as a loss; it falls to the ground where it decomposes, and in part repays the soil for what it has abstracted from it, and thus serves to fertilize it and enable it the better to nourish and bring forth its next crop.

12th Query. What quantity of seed of each of the several grasses should be sown—when—and how should the ground be prepared, manured, &c?

Answer to the 12th Query. In order to prepare lands in the best manner for grass seed, all the native grass and weeds must be completely eradicated by the culture of mellowing crops; such as Indian corn, tobacco, cotton or potatoes, or by a cleansing fallow of repeated ploughings and harrowings during the spring and summer; and if not rich enough to produce from five to six barrels, of five bushels each of corn, to the acre, manure the land and plough it in with a shallow furrow just before sowing the seed. If lime or ashes should be used, it will be best to harrow them in.

I prefer sowing the spear grass seeds in the latitude of Baltimore from the 1st to the 25th of September. However, on stiff clay they may be sown later, as also on sandy lands, owing to the injurious effects resulting from their heated surface. For every degree south of, and parallel with, Baltimore, and the sea-coast, sow the spear grass seeds about ten days later: and in the spring sow clover seed ten days earlier.

I sow about the same quantity of oat grass seed as of orchard, and about five quarts of timothy seed, and one-half a bushel of herds. It is the neatest way to sow the spear grasses by themselves: nor do they require, in my opinion, the protection of grain crops; but it is however, sometimes a convenience to sow these seeds on wheat, rye and oat fields—and often very judicious in a routine of crops. It is not, nevertheless, always best on grazing farms, the shattering grain frequently proving a weed to the succeeding grass crops, whilst those grain crops, themselves, substract much of the nutriment which should have been permitted to, and otherwise would, have sustained the grass.

Respectfully, thy friend,

ROBERT SINCLAIR.

From the Southern Agriculturist.

ON THE BENEFIT DERIVED FROM THE PEA CROP.

Woodlands, (Ala.) April 15, 1835.

Dear Sir—The great benefits derived from the pea crop in the south, are generally known to planters, but it will be readily granted by those acquainted with southern agriculture, that the advantages which a knowledge of this fact might give to them, are but partially experienced, owing to the want of being informed of a successful and ready mode of preserving that valuable plant. In No. 12, for December last, I think this subject is brought forward by one of your writers, and whose remarks has induced me, sir, to offer to you, and through your truly valuable periodical, the mite of my practical knowledge of the value of the pea, arising from the manner in which I cultivate and preserve it, and also apply it in the feeding and support of stock. And here, I beg leave to suggest an idea, the application of which I have frequently noticed, and not unfrequently felt, viz. that the relative value of any product of planting industry depends in a great degree on a judicious application of it, and a strict adherence to a well timed system of economy. Under a belief in the truth of this remark, I have appropriated my pea crop exclusively to the support of my milch cows and sheep, and fattening kids. It aids equally in the production of superior milk and butter during the winter, and fine mutton and lamb—four prominent items in comfortable living. The pea crop claims a considerable credit from the circumstance of being produced by the same labor that brings to maturity a crop of corn. Another value is fairly claimed by this plant, as an ameliorator of the soil, independent of a valuable product. The pea can be sown or planted after a crop of small grain is taken from the ground. My practice is to cut my rye and oats, what would be called early, or just before they are perfectly ripe, remove the grain from the field, and stack to cure, in some other, and turn in the stubble as soon as possible on peas previously sown—and this course more especially to improve my land, which last would be partially lost by cultivating the peas. This course is adopted also, not only to improve the land but to admit the pea to be put into the ground in good time to secure a heavy crop, and to give greater value to the straw of the oats or rye, and which I stack, or rather house, sometimes the day after cutting, by giving a liberal quantity of salt, sprinkling it over as I stack the last.

When I plant the pea with the corn crop, I put the seed into the ground uniformly, so as to secure one ploughing of the corn to the pea, as also a liberal share of the hoe. As early as the pea reaches maturity, anticipating about the time now admitted, in saving small grain, viz. "just before it is perfectly ripe," while yet the leaf and vine exhibit a growing state, the peas are pulled up, or cut at the ground, with knives made for the purpose of cutting down corn, the cutters returning along the row, cut by them, and gathering into small armsfull, raise up the bunch, placing it as upright as it can be made to stand, for the more free admittance of sun and air. If planted among corn, this last has been sometimes removed from the field, by being cut at the ground, saving in this way, stalks, blades, tops and corn. After one day's sun, I turn and raise up the bunches of vine and peas, and if any assurance of the continuance of good weather can be seen, I give them another day. The following I haul in, on a long coupled low-wheel wagon, fixed for the purpose with racks. Satisfied from reason and experience, that open pens are better calculated for the preservation of every kind of straw and vines in our climate, than close buildings, I have pens built of chestnut rails, about twelve feet in length, which pens can be removed at pleasure: in them I placed a tight floor of jointed plank, moveable if required, and raised about two feet from the ground. On this floor I lay a little well cured and dry wheat, rye, oats, or rice-straw, and on this, pea vines are put, until the layer, after being pressed down by the weight of a child, will be about twelve inches thick; on this layer salt is scattered—there is no loss by scattering the salt freely, the floor ultimately arresting what passes through in handling and feeding; what goes off with the pea vines being necessary for the thriving and health of the animals fed—the first going to salt my hogs the next year. The scattering of the salt is followed by straw, peas as before, and salt, until the pen is filled. when the roof of broad and sound clapboards is laid on, and secured by cross-rails, which interlock with the last put on.

In this mode of housing my pea crop, I consult saving time, convenience and economy. In place of a door, I have three of the rails so fixed on the front side, (or whatever one is most convenient to take out) that they can be moved as bars. The leaves and vines are generally taken out as green and sweet as when housed, and if possible, submitted to the cutting box, and which is found an excellent preparation for the use of the animal feeding on them. This last enables them to fill themselves much sooner. The vines are cut about an inch, and if not steamed, (which is a superior preparation for milch cows) are put into the feeding trough, and sprinkled with a liquid preparation of water, with as much corn or rye-meal in it as will produce the vinous fermentation, and used just as the *acetus* has commenced.

By pursuing this mode of saving, and using this plant, it will readily occur that an acre gives, when either planted among corn, or sown after grain, a fine quantity of dry winter food, and of a most nutritious character.

The period at which the vines are taken up, makes the pod hold the pea much more tenaciously than if suffered to get perfectly ripe; consequently there is less waste in feeding. A few pigs suffered to run in the cattle or sheep pens, accounts honestly for every pea. If fed in racks, the peas may be fairly credited with the maintainance of one pig for every sheep, and four for each cow, during the time of feeding.

The straw is given out with the vines and eaten with avidity, evidently imbibing so much of the quality of the pea as to become very agreeable to the taste of animals, particularly oxen, to whom I give it frequently. In filling the pen, I place a large keg in the centre, drawing it up as I progress. This leaves an opening for the escape of any product of fermentation that may arise, as also, for the entrance of atmosperic air.

For a stock of that valuable animal, the sheep, there cannot be a superior winter provision, especially if a few turnips are added, or an hour in the day in a rye-field, with pointed attention to salting.

From a fair trial, I know this mode of feeding that animal, preserves a fine state of flesh, fleece and health, during our short winters. With some, kid is a delicacy, kept on this food along with the sheep, the real "savory meat" may be had.

CINCINNATUS.

KILNS FOR DRYING CORN—MODE OF INVESTIGATION IN THE CHEAT CONTROVERSY.

To the Editor of the Farmers' Register.

Granville, N. C. July 14, 1835.

I am desirous of erecting a kiln for the purpose of drying Indian corn to be ground into meal in the spring, and kept for use during the summer months. Will you be so good as to furnish through your Register, the most approved plan of building them? The size, the mode, and material of construction, &c.

The cheat controversy has escaped unsettled from your paper. If wheat is changed to cheat the fact may be demonstratively shown by carefully taking up by the roots the bunches of cheat, and washing the earth from the roots. If the hull of the parent grain of wheat can be found attached to the cheat, no one can longer doubt that the change does take place. I have in this way washed and examined often the roots of wheat and of cheat: the hull of the grain of wheat I generally found adhering to the roots of the wheat, but never to the cheat.

W. O. GREGORY.

For the Farmers' Register.

LUCERNE—MANURE ON BARREN SOILS.

Lynchburg, July 9th, 1835.

This valuable grass is not sufficiently known among our farmers. I have had a lot of it for several years, and am much pleased with it. Although it is not calculated to supercede clover on a large scale, and one cutting does not produce quite as much, yet it has several advantages. It is fit for use twelve or fifteen days earlier—can be cut from four to six times a year—never salivates, but is good throughout the season, and does not require renewing for many years. Every farmer should have, at least, a sufficient lot of it, but as it requires free manuring, it will, as a *crop* suit only those who have much manure and little land. And here permit me to make a few suggestions respecting manure. Every well directed movement that is made in relation to this article gives the most ample returns, but like all other operations, it requires judgement. Rich stable manure ought to remain *under a shelter* till carried to the field. Only observe the large quantity of highly colored water it gives out after a heavy rain. When there is plenty of straw, corn stalks and other litter, the case is different, as these absorb what would otherwise run off. Indeed it is probable that a large portion of the value of the corn stalk as a manure, is owing to its capacity for absorption. In general, land that is "*born poor*" cannot be manured to advantage, until something is done to change its *constitution*, whether it be lime, marl, burnt clay, ashes or other substances. We all know that the decomposition of vegetable matter tends to improve the generality of soils: yet there is land in our country that has had weeds, grass, leaves and other matter rotting on it for hundreds, and perhaps thousands of years, and is yet poor. There are lands in the neighborhood of large cities which the skill of the chemist and farmer combined, has not been able to render fertile. I am informed there is land not many miles from London itself, that has never been made productive. It would certainly be a waste of manure to put it on such stubborn soils. I am aware, Mr. Editor, that some of your readers understand these things much better than I do, but there are others who have paid little attention to the subject, and you know that to impart information, and correct bad habits of long standing in many persons, requires "precept on precept, and line upon line."

M. D.

EFFECT OF QUICKLIME ON THE MAGGOTS OF HESSIAN FLY. CROPS OF WHEAT IN THE VALLEY.

To the Editor of the Farmers' Register.

Augusta County, Va., July 16, 1835.

You requested "a statement of some experiments and observations on Hessian fly." I have made no experiments on that subject, but suppose Mr. A. referred to some observations on that subject made by me when he was here sometime since. It consists in sowing lime on the wheat at the time it begins to shoot; the theory of the *modus operandi* is, that the egg that produces the worm, or small insect, is deposited through the blades of the wheat, and obtains vitality about the time the stem begins to shoot or rise up, and it begins then to eat it, or by its bulk prevent the growth of the stalk. The remedy is then to sow broadcast lime, first made as fine as possible and dry; and it must be sowed when there is a heavy dew, or during a shower of rain. About a bushel of lime to an acre is thought to be sufficient. I had last summer an opportunity of observing a piece of wheat that was treated in this manner. It appeared to become yellow and be on the decline; and after the application of the lime, it changed color and appeared recruited, and was at harvest almost as good as the other part of the field, in which there was not any fly. You can readily conceive the manner of the water or dew on the wheat becoming impregnated with lime, which it must receive in the process of sowing, and running down the stalk, and coming in contact with the young fly, and destroying it by its caustic qualities.

The apprehension of the most desponding is realized, as to the product of the crops of wheat in this region of country. It has been estimated at one-fourth of an ordinary crop. Perhaps taking Augusta County, it may turn out so—but in my neighborhood, I think, it will not be so much. I think that I will not have more than the seed sown, if so much—but some others will have half a crop, and some few as good as ordinary. Wheat does not ripen as it generally does—it is now the 16th of July, and I have harvested none as yet, though some people are cutting now. The time of commencing harvest here, is usually in the last of June or first of July. Wheat is generally thin on the ground, and we have had a late and cold spring, and wheat is taken with mildew, scab, smut, and almost every disease to which it is subject—and being so thin as not to cover the ground, weeds and cheat, and all kinds of trash grow up with the wheat. In Rockbridge, the county next up the Valley, the crops of wheat are much better than in this county: in many parts of that county I am told their crops of wheat are good—but down the Valley to the Potomac, I believe the crops have in a great measure failed.

WM. M. TATE.

For the Farmers' Register.

ON THE BAD EFFECTS OF COLD ON SOILS AND THEIR PRODUCTS.

Wardsfork, Charlotte.

In the first place, in those regions of the earth where winter is most severe, the soil is the most steril; and where warmth prevails, fertility abounds.

Secondly. Nature provides against the bad effects of frost, by covering the earth with trees, whose leaves dropping in autumn, prepare a covering against winter. Where cold is so severe as to benumb the vital principle of soil, there is nothing but barrenness.

Thirdly. Land newly cleared, is most productive (if well broke) the first year, being long secured from freezing by a bed of leaves. And those parts of the clearing produce best which have a southern exposure.

Fourthly. Land produces better after being covered during the winter by deep snows, as these snows prevent freezing.

Fifthly. Land is more productive where it is covered during the winter by logs, brush, stacks, and even rocks and clay, where there is no marl. Soils brought up from below the reach of frost, will also produce best.

Sixthly. Land broke in the fall and exposed to the winter freeze, does not produce so kindly as when broke in the spring: though the opposite notion is held by most, but it is neither agreeable to reason nor to nature. Uncovering the earth in the fall exposes it to all the disorganizing effects of wet and cold. Forwarding business, is the only thing that can be said in favor of fall ploughing.

Seventhly. The method which nature takes to restore exhausted soil, shows it is injured by cold. There is a *vis medicatrix* in inanimate, as well as animated nature. The way we are told to become eminent in medicine, is to watch the movement of the conservative principle; and so I judge it is in agriculture. When exhausted land is thrown out of cultivation, the conservative principle begins to prepare a covering for the soil. The broom-straw is generally selected. This humble sedge is only of negative advantage—nature only aims at a piece of economy—a home dress to hide nakedness and keep off cold, and tie the soil together, until she can prepare a better suit. The action of frost without this covering, would be altogether destructive. I have observed after a freeze succeeded by rains, the galls increase for want of broomstraw to hold the soil together, and there is a perpetual dividing and crumbling of particles of earth, and a vast quantity of this "real estate" is *really* hastening off to the sea. Such a "removal of the deposites" is producing waste and want in the land. It is for the want of nature's covering, that galls become gulleys—cultivation never made gulleys. Bad cultivation, to be sure, will assist; but good cultivation will not prevent the bad effects of freezing. Nature clearly shows that the mode of defence against this destructive agent, cold, is the covering of the surface. The next after the growth of sedge, is the old-field pine. Here nature aims at something more than a negative good: soil improves somewhat under this thick warm evergreen shelter, so secure against the action of frost. Nature surely abhors nakedness as much as she abhors a vacuum!

With some practical inferences, I shall conclude.

In the first place, I infer that the best mode of shielding the soil against the action of winter, is the great desideratum. Throwing your coarse manure over the surface, would contribute to this end. So would brush and other offal of your new-grounds. It also points out the great advantage of raising those grasses which would not only protect the soil against heat, but cold also.

Secondly. Galls and gulleys must be healed by covering them effectually against the action of frost, and diverting the rain waters from them by protectors. Never suffer any place naked of soil to be naked of clothing or covering. For cold in winter, is like old Harry Lee was in war: it makes for the weak points. It will be nibbling at such places through the whole winter, and they will be increased every year. What with the growing of *Yankee collections* and winter freezing, I think Old Virginia is dying not a very lingering death.

Thirdly. I infer that it is best to plough land in the spring; that plant beds should be covered during winter, and also garden spots; as keeping out the cold quickens the vegetating principle, and gives a forward growth to plants.

Fourthly. I infer that there is no necessity for the four-shift system, the grand promoter of emigration, sending off more than would an annual insurrection. If our fields were kept well covered with vegetation, and coarse litter, there would be no need of so much rest. The monopoly of landed property now increasing, and shoving out many of the laboring people to the west, is a serious matter to Virginia, and it arises in some measure from the idea, that it takes a longer time to make land rich, and it must be done by rest principally. If this notion remains with us long, the bone and sinew of the state will be driven off, and who will be left behind? A few of the genteel with their many *shifts* and many '*negers*' will have more high blood than high pluck, more bowels than brains; and will in less than a half century, (if they breed at all,) by marrying (but not loving) their rich cousins, fill the land with halt, withered and blind, which would take another pool of Siloam with an angel to trouble it, to make them whole again.

The view I have taken, suggests the necessity of covering the soil around the roots of grape vines, valuable shrubs, and fruit trees. Does not the close observer of nature see how she covers the roots of trees with leaves, full time enough to guard against winter? J. R.

From the Penny Magazine.

ON THE HATCHING OF POULTRY.

In the hatching of poultry, as in most other things, nature is the best guide. The hen and duck, if left to themselves, find some dry, warm, sandy hedge or bank, in which to deposite their eggs, forming their nests of leaves, moss, or dry grass. In this way the warmth is retained when the bird quits the nest for the moments she devotes to her scanty and hurried meal. The good housewife's mode is the reverse of this. She makes a nest, or box, of stone, brick, or wood, and fills it with clean long straw. By this means, less heat is generated by the hen, and that which is produced quickly escapes in her occasional absences;—the eggs are chilled and addled, and frequent failures ensue in the expected brood. To obviate this, the best mode is to put at the bottom and sides of the boxes of the henhouse, a sufficient quantity of fine, dry sand, or of coal or wood ashes, lining them with a little well-broken dry grass, or untwisted hay-bands, or moss, or bruised straw. Wood-ashes have been found to be the best, as they produce the effect of destroying the fleas by which poultry are so much infested; and that this will not be disagreeable to them is evident from the propensity which they have to roll in heaps of dust, or of ashes of any kind. An experienced rearer of poultry adopted the method above described during a long course of years and scarcely ever met with a disappointment.

From the Franklin Mercury.

A PROFITABLE CROP OF MULBERRY PLANTS.

A Northampton gentleman planted last year a half-paper (costing twenty-five cents) of the Morus Multicaulis, or Chinese Mulberry. The seed occupied a few feet square of his garden, and the plants came up to the number of about two hundred and forty. For these plants he has repeatedly this season been offered twenty-five cents each. The principal reason of this, however, is that the seed originally procured of this species of mulberry has all been consumed, and there is not much probability that any more good seed can be procured from the same quarter; and some years, of course, must be elapsed before it can be procured from the native trees. Other parcels of this seed have been obtained from China since the first was imported, but none of them have produced anything, having without doubt under the influence of the proverbial jealousy of the Chinese been subjected to some process, which, without affecting the appearance, destroyed the fructifying principle.

[The foregoing is a striking illustration of how many losses and disappointments will be sustained, before it is generally known that no reliance can be placed on the seeds of the Chinese mulberry for producing the same kind of plants. The several translated articles on this subject, which have been given in this journal, if regarded, would serve as very important instructions to those who seek to propagate this tree. If indeed it is true, (as alleged above) that the Chinese have destroyed the germinating power of the seeds before selling them, by the intended fraud they have rendered a service: as it is better to be disappointed by the seeds not sprouting, than in the kind of crop expected from them, after years have been devoted to the culture.]

From the Penny Magazine.

WILD DOGS IN VAN DIEMEN'S LAND.

The annoyance and danger occasioned by the wild-dogs in Van Diemen's Land is still a subject of great complaint in the papers of that colony; and the most active exertions hitherto used seem to have had little effect in abating the nuisance. The dogs appear rather to increase in number and boldness. A case is mentioned in which a person named Akerly was assaulted by thirteen of these animals, and would probably have been killed if he had not contrived to get up into a tree. The means hitherto employed to eradicate them do not seem to have been commensurate with the growth of the evil. A society has been established at Gaddesden, near Campbell Town, to effect their destruction; and the house of the chairman exhibits a collection of skins, to the number of a hundred, of dogs that have been killed, of almost all kinds, from the shepherd-dog to the Newfoundland. It is thought that unless the most decided measures are taken, it will be impossible to pasture sheep in the colony. The dogs bring forth six or eight young at a litter, and commence breeding at one year old, while the sheep brings forth only one, and does not commence breeding until two years of age. The ultimate and discouraging prospect which this opens is brought nearer by the daily defection of the domestic dogs of the colony to the wild ones. "At the remote stock-hunts," says a recent paper, "a free man keeps as many dogs as he pleases; frequently six or eight are kept; these dogs provide for themselves, and continually make off to the wild packs. All remonstrance is received with a smile of contempt, and returned by insult; and until such people are strictly prohibited from keeping dogs in the pastoral districts under heavy penalties, matters are not likely to mend: indeed it is to be feared that the evil is fixed for ever—that it has been too long neglected, and is now past remedy." We are too well assured of the resources and power of civilized men to partake of these apprehensions; but any delay now in organizing a plan of simultaneous operation against the dogs, is likely to render their future extirpation a matter of great and increasing difficulty and expense. Meanwhile, at this distance from the spot, it is interesting to watch the various aspects in which this remarkable state of things appears, and to observe the different measures which it may be necessary to adopt against the canine depredators. Since writing the above we find that an "Act of Council" has been issued for the purpose of restraining the increase of dogs. All dogs are to be registered; and none are to be left at large except in Hobart Town and Launceston. Unregistered dogs, or dogs found at large contrary to this order, are to be killed. The persons killing them are to be paid from 5s. to 40s. for each, out of a fund formed by the registration fees. The registration fee for a watch-dog kept chained, or a sheep dog, is 2s. 6d.; all other dogs 10s., or if females double the respective amounts. The local newspapers are not very sanguine in expectations of good from this measure.

EXTRACTS OF PRIVATE CORRESPONDENCE.

Abbeville, S. C., July 11th, 1835.

I congratulate you, sir, on the growing circulation of the Register. Yet it is a matter of surprise that a useful publication like this, which interests nine-tenths of the people, should not be still more eagerly sought for, and liberally sustained. Is agriculture, the first, noblest pursuit of man, unworthy of the investigation of the principles which constitute it a science, and of their proper application to practical purposes? This question will be promptly answered in the negative; still men, by their acts, seem to affirm otherwise. It is certain that one of the most efficient means of rendering service to the cultivators of the soil, is to present, in one view, the results of individual experience, by the examination and comparison of which, some principle may be deduced and established. And as the remoteness of individuals from each other preclude the practicability of a personal interchange of thoughts and opinions, such a work as the Register, may, through the facilities furnished by the press and post office, remove the barrier, and bring men who live many hundred miles apart together, without scarcely any trouble or expense. Its title to patronage is too obvious to demand labored reasons to prove it.

Columbia, S. C. July 12, 1835.

I had intended when I next wrote to you, to say how I was pleased to travel over again the farm of Lagrange in your last number. Our great and good friend Gen. Lafayette, and his son-in-law Mr. Delasterie, took me to see the whole of it, at which I was, of course, much gratified. I recognized most of the particulars as I read the account. The farm of Lagrange is, I believe, the best as to quality of land of that part of country; but some of his neighbors who have also their farms in the best order, deserve much more credit than they generally get; for, if I am not very much mistaken, they had to work on a most miserable flat, white and wet soil, and nothing but great skill and great industry could have made such farms as I saw there in a state of improvement.

Prince George, July 21, 1835.

I send you specimens of the *turkey*, and of the *blue stem wheat*; a couple of heads and some of the grains of each. They are both very fine. Examine them attentively, and see if you can discover any difference. They were raised but a short distance apart, a space of but 15 or 20 feet intervening; and bore so strong a resemblance throughout the whole period of their growth, as to leave on my mind but little doubt of their identity. If it be the same wheat, it may save some trouble to those who, or whose neighbors, cultivate it under the name of "blue stem," to be apprised of the fact. From the high reputation of the turkey wheat, they might incur some trouble and expense, too, to get that which they already have. I have been somewhat disappointed by finding that I have but one valuable variety, where I expected two. The blue stem has the character on the Pamunkey, where I derived my specimen, of being peculiarly adapted to low grounds, but is not otherwise considered a very productive kind. I understand it is exempt from the *strut*, as it is called in this neighborhood, to which the *purple straw* is unfortunately so liable.

While on the subject of wheat permit me to ask, through you, a description of the "*Washington white wheat*" of Maryland. Is it a bearded wheat, resembling at maturity, while standing in the field, the *golden chaff?* I received a barrel last fall, selected with some care, in Baltimore, under that name, which accords with the above description, but has turned out very indifferently, whence I infer that there may have been a mistake.

[The two samples of wheat seem, both in grain and head, to be precisely alike. Until receiving this sample of "blue stem," and finding it a white wheat, we had been deceived by that name, and supposed that it was meant for the "purple straw," of which the name is equally descriptive. Thus it frequently happens, from the confusion in agricultural nomenclature, that a term known to every body in one part of the country, is either unknown, or is applied to something else, at the distance of a hundred miles, or less.]

PROSPECT OF SEASON AND CROPS.

From all the information received, there is but little doubt left of a general loss in the wheat crop of Virginia, of between one-half and two-thirds. In Lower Virginia, we have heard of good crops no where, except in the neighborhood of Williamsburg—and all were not good even in that small space. The sufferers in such cases are apt to be persuaded that their losses are greater than afterwards may be found true—and besides, we have only statements limited to particular farms, or at most, particular regions of the state. But our reports all came from known and highly respectable correspondents, and are in every case made as correctly as the writers' lights have permitted. In this respect, they stand on a very different footing from the usual reports which appear in commercial newspapers, and which often are written by dealers and speculators, with the view of affecting prices for their private gain.

The crops of wheat in Pennsylvania are fine—and so it is lately said of New Jersey, and at least part of New York. The price in Virginia therefore cannot be as high as is generally supposed.

The corn in Lower Virginia now promises a good harvest. But much of its present luxuriance is owing to the recent frequent and abundant rains, which have produced a degree of succulence which will be the source of greater injury to the crop, should a severe drought occur in August. The uncertainty of the result, and the risk of diminished product is not lessened, but increased, by the present fine appearance of the growth.

July 29, 1835.

Lynchburg, July 9th, 1835.

A terrible tempest of wind, rain and hail passed over the centre of this place on the 27th of June, and in its range *totally destroyed* wheat, rye, oats, corn, and garden vegetables, and broke all the window glass which was exposed. Twenty-five birds, mostly doves, were found dead under one tree in a field near town. Much of the hail was solid, and large and heavy as hens' eggs; and several credible gentlemen say they saw stones big as a man's fist. It was something over a mile wide, and commenced in Botetourt, fifty miles or so west of this, and continued, I know not how far down. A similar storm, reported in the Enquirer, on the same day in Chesterfield, was probably a continuation of the same cloud.

Abbeville, S. C., 11th July, 1835.

The crops in this section of South Carolina, are more backward than it was ever known—and what I affirm of them here, may be justly predicated of them throughout the state. Our great staple, cotton, has been retarded in its growth by the lingering of winter in the bosom of spring. Planters commenced to commit their seed to the earth at the usual time in April, but the coldness of the soil produced by a winter of unparalleled rigor, and the hard chilling rains which succeeded the planting, destroyed the vegetative principle of many of the seeds, and caused, what is here termed, a "bad stand." These unpropitious circumstances, made the plants that did protrude through the crust of the ground, puny and sickly; thus rendering it almost indispensable to replant. The reward of the planter's toil now depends much upon the subsequent season, and the late arrival of frost in autumn. Indian corn, which is a more hardy plant, and can endure tribulations that would be death to its more tender neighbor, cotton, exhibits a more flattering prospect, except in such vicinities as have been visited by a drought of long continuance. But the rains begin now to descend in copious showers, and if they continue, corn crops will, no doubt, yield well. The oats are in general good, and have just been harvested. There was an almost total failure of the wheat crop. The intense cold of the winter killed it almost entirely, and some of that which did survive, was injured by the rust. The quantity raised will not near supply the demand for home consumption. Flour is now selling from nine to ten dollars the barrel. We must look to the north to supply the demand. Wheat with us has proved generally an uncertain crop—but I cannot avoid believing, that this is owing to a very defective preparation of the soil, and a want of attention to the selection of proper seed—though I will not venture to assert, that our southern climate is as congenial to its growth as a more northern one.

King George, July 13, 1835.

I am just finishing my harvest—the latest within the memory of our old men—and the most unprofitable. I do not think that I shall make more than one-third of an average crop. One-third of my crop was a clover fallow, the product of which will probably equal that of the balance, which was sown upon the best of the corn land. My estimate is, that the fallow will bring only four for one. The fly did me infinitely more mischief than the excessive cold of the winter. I observe that the wheat was better where the clover was plastered.

Frederick, Va., July 23rd, 1835.

Harvest is now over in this Valley pretty generally, and the reports of the newspapers to the contrary notwithstanding, I think the average crop of the Valley will not exceed one-fourth.

A CHAPTER ON DISCONTINUANCES OF SUBSCRIPTIONS.

If the Farmers' Register could live upon praises, it would be in a most thriving way—and there would be little ground to entertain fears for its decline, and final suppression, for want of a continued and sufficient support. If we were so disposed, we could fill many pages with unbought and unsought expressions of approbation from various subscribers and correspondents, and which however mistaken, or exaggerated, as testimonies of the value of this journal, were given (it may be presumed) as honestly as voluntarily, on the part of the writers. Very many of our correspondents know that passages of their communications of this kind have been either omitted entirely, thereby incurring some risk of offending our best friends, or the expressions of their favor and approbation have been softened and moderated in the publication, when they were so connected with the more important subject of the communication, that such passages could not be left out. This course has been taken, because such expressions of approbation, if published as received, would be considered more as evidences of editorial vanity, than merit—and would be confounded with the ordinary "puffs" which are so easy to procure, and the fabrication of which now forms a regular but disgraceful part of the trade of publication—and is a branch of the trade which is the most profitable to the least deserving.

But it is remarkable, (and would be not a little amusing to others less interested than ourselves—) that many of those who lavish praise on our work, at the same time announce the discontinuance of their support. Now we are well aware that kind feelings may often induce these disagreeable annunciations to be accompanied and softened by expressions of approbation—but we cannot therefore distrust the sincerity of the opinions so expressed, and which are altogether voluntary, and uncalled for. When any subscriber chooses to withdraw his support from a work, after having complied with all his obligation incurred on that account, there is no need of reasons or excuses being given for his discontinuance. Between him and the publisher, the transaction is a mere matter of business—an exchange of a certain amount of money, paid by the one, for certain services to be rendered by the other—and neither of the parties is under any obligation to the other, beyond the payment of the sum, or the service; nor to continue the bargain longer than it is desirable, or than a full equivalent is received for what is paid. If we expected more than this, we should be at least ashamed to acknowledge it. We only ask those who wish to withdraw their support, to do so in proper time. The whole year is open to them for that purpose, and when payment is made, and a discontinuance ordered for the end of the current volume, it will be as readily and as certainly entered early, as late. But many will subject the publisher to sending out one and even two or more monthly numbers of a new volume, before announcing an intention to stop at the end of the previous one: and in many cases, he is compelled to submit to this most unjustifiable imposition. The course of subscribers in such cases, is either civilly begging that a debt fairly incurred by them shall be remitted gratuitously by the creditor—or otherwise the debt is boldly denied, and the creditor must submit to the spoliation, for want of means for redress.

So far the matter is considered as between individuals—and so far, the editor pretends to have no claims on any subscriber's support—nor for any thing more than a bare compliance with obligations actually incurred. But there is another and more important point of view, to which attention is due. This applies to the general interest of the agricultural community, in the maintenance of the Farmers' Register, considered without regard to any particular or private interest, either of publisher or subscribers. Whatever may be the true degree of applause due to the operation of this journal—whether it be fixed according to the partial estimate of its warmest friends and zealous supporters, or of those who have never aided its efforts—or at any average degree between the opinions of friends and of *enemies*—it will certainly appear, that through this medium much service has been rendered to agricultural improvement and agricultural interests, even during its short course—and that such effects may be necessarily expected to continue to increase, with the age and increased influence of the work. If any persons deem the Farmers' Register to be worthless—or that its place would be better filled by any other agricultural publication—they are right to withhold their support. But among the great number who entertain opinions altogether opposed to these—who indeed would testify the most strongly in favor of its useful effects—it is strange that there should be so large a number who have never lent any support, or having done so, have withdrawn it. If only a tythe of the benefits anticipated from such a journal were to be realized to the agricultural community—and even admitting that an individual should derive from it no special and private benefit, but only his proportion of the general benefits shared by all the agricultural community, it would be manifest that his subscription for life, would be of very inconsiderable amount, compared to his share of the general benefit to be thus derived.

QUERIES.

Queries on the following subjects have been addressed to us. We owe an apology for the long delay of the first, which was caused by unintentional oversight.

1st. What is the proper mode of thatching houses with straw? And would the practice be economical in Lower Virginia?

2nd. What is the best size, form, and model of fixing a roller, to be used on level and light land, for the purpose of giving the soil greater firmness by pressure?

THE FARMERS' REGISTER.

VOL. III. SEPTEMBER, 1835. No. 5.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

For the Farmers' Register.

OBSERVATIONS ON THE LOW WAGES OF FEMALE LABORERS.—No. 1.

The general depression of the wages of laboring females in this country, and the peculiar circumstances which condemn to unceasing toil, and severe privation, so large and meritorious a portion of the whole community, are subjects which well deserve the consideration of every one who has a share in the general interest. It is not only a matter calling for the action of the philanthropist—but it also has an important bearing on the public economy and national wealth; and *may affect*, if it does not already threaten, the private interest and family affections of every individual. This is as yet a country of plenty—one in which the industrious laboring man cannot fail to earn the necessaries of life, and in which the labor of a day will generally suffice to provide the bare necessaries of life for a week. Yet not content with the wages which demand and fair competition will always properly adjust, nothing is now heard of in the northern cities but the combinations, and "*strikes*," of bodies of laborers, and the resort to every means of intimidation, to enforce their unjust and lawless claims for higher wages, or for reduced hours of labor. It is not designed here to consider the operation of these combinations, or to show that, even when successful, the consequences would be injurious to those who seek benefit from them, as well as to their employers and to the community at large. The conduct of these full-fed, yet discontented and riotous laborers, is merely here named to be contrasted with the condition of the thousands of females, who, in silence and in hunger, and under fears of still greater miseries in future, labor incessantly to prolong a wretched existence. Why should such a difference in the rewards for labor exist, and be increasing in degree, between the two sexes? And are there no proper means of removing, or at least of alleviating the evil as it regards women?

Benevolent and public spirited men have recently taken this subject into consideration, and have commenced acting, with more zeal perhaps than discretion. It is feared that their efforts are not properly directed, and will therefore produce no permanent or beneficial result. Public meetings have been called, in Philadelphia, of the laboring females, and reports of the existing grievances have been ordered—resolutions entered into of the propriety and necessity of increasing wages, and a plan devised (as is inferred from the imperfect and concise statements in the newspapers,) for forming associations of females, like the "trade's unions" of men, to combine their wishes, and to *enforce* their demands. All this will be ineffectual—and much worse than merely ineffectual. The assembling of females in public meetings, is a violent departure from the retiring modesty which has heretofore distinguished our country women, the poor no less than the rich. By previous habits they are unfitted (and long may they remain so,) to take part in public deliberation and action. Even were it otherwise, combinations of females cannot possibly *compel* an advance of wages, as is often attempted and effected by associations of men—and if they could, the results would be liable to the same general objections. Without drawing together, for public gaze, thousands of the sufferers, it would be as easy to ascertain and make public their cruel oppressions. As to any number of individuals, resolving that they will pay higher wages, and adhereing to that course, it would merely operate as charitable gifts to particular persons, and could have no effect in curing the general evil. To do this, the causes must be removed: the evil must be attacked, not at the latest shoots of its branches, but at its root—which will be found in the habits and institutions of society in this country.

Why is it that, while mechanics generally in our towns can earn at least $1 for 10 hours labor, very many of the most industrious and competent female laborers, or mechanics, for 15 hours work, seldom earn one-fourth, if indeed one-eighth as much? The answer would be ready, if the occupations were such as to require the whole strength of a healthy man. But this is very rarely the case. In most kinds of mechanical labor, skill, dexterity, and patience, are more required than mere physical force—and women, if employed, would as well or even better than men, execute the same labors, and deserve at least as high rewards. But the misfortune is, that while every mechanical employment, save two or three, (those of milliners and mantua makers are perhaps the only exceptions,) are open to men, women in Virginia, and wherever manufactures are not in extensive operation, are confined almost entirely to sewing. There are at least as many poor women as of poor men—and the labor of half of all the portion of the community dependent on labor for bread, is *not only forced into one single employment, but is driven from the most profitable part of that employment, to make way for the other sex.* Men's clothes, by usage and fashion, have been almost entirely given up to be made by males—and in many cases, the male merely receives the price, while females, for a small proportion of it, actually perform the whole labor.

Now suppose that the tyranny of law, or of custom or fashion, of religious prejudice, or any thing whatever, compelled a very large proportion of the laboring men to confine their efforts to a business which one-third of their number could as well execute: would it not be a certain consequence that their competition and urgent necessities would depress their wages to the lowest possible state? If 20,000 shoemakers were enough to supply the wants of our country, and 40,000 other persons were compelled to make shoes, or to be deprived of all other employment, it is evident that the wages for this kind of labor, would be reduced as low as are now those of poor female seamstresses; shoemakers, almost without exception, would be reduced to the greatest necessity and state of suffering. If the proper and necessary number of the trade (which was supposed to be 20,000,) could have effectually combined, or any portions of them, to raise wages, it is as obvious as it is certain, that it could not be done when thrice that number had to share the employment and the wages, and were almost starving on the insufficient dividend. Therefore, combinations of women to compel the raising of the wages will be altogether ineffectual. as all such combinations are altogether wrong, and injurious in their tendency.

But the main reliance seems to be, that the persons who pay these stinted wages of labor, may be impressed with the enormity of the grievance, and voluntarily consent to increase them to a fair and reasonable demand. Doubtless many individuals are ready to yield to such promptings of benevolent feeling: but however numerous the cases may be, and however liberal may be the advance made on previous prices, the remedy for suffering will be but slight, and no remedy whatever will thereby be offered for the real evil—that is, the general and fixed depressed prices for female labor. By possibility, thousands of individuals may be induced to pay double prices. (and double prices would be required at least,) as wages for the employment which their private and personal demands would create—and thousands of deserving workwomen might thereby obtain a fair recompense for their toil, and an exemption from their previous sufferings. But even the occurrence of this rare (not to say impossible) exercise of charity, would not benefit the still greater number, who were not so favored by other employers—and indeed, would rather cause them increased injury. And no confidence could be placed in the permanency of even the very partial relief that would be afforded. It is an established truth, that prices for labor, as for commodities, will always be regulated by the proportion of supply and demand—and that they never can be materially affected, nor for any length of time, by any other considerations than the *interest* of the contracting parties. Laborers, as a body, will always take as high wages as they can obtain—and their employers will give no higher than the lowest which will suffice to command the services required. This general operation of such causes, if properly considered, will show that no relief can be hoped from any voluntary offers of increased wages.

The remarks which have been submitted, apply more particularly to the state of society in Virginia, and other parts of the United States where there are few or no factories which call for female laborers. When such factories are introduced extensively, they extend the field of woman's labor, and serve to increase their wages—at least in the beginning. But it is found, ultimately, that one evil has only been exchanged for others of not less weight. However, it is not intended here to enter upon the consideration of such changes in habits and industry—but only of society and habits as existing in a community not much advanced in manufactures.

Except in towns, it is literally the case in Virginia, that poor females have no employment whatever, by which they can gain wages, but in sewing. Weaving and knitting formerly furnished more employment, but now scarcely any worth naming, on account of the improvements in weaving on a large scale, and the consequent reduction of price. As the small proportion of sewing which is shared among the many who would gladly be employed, would not suffice for one-fourth of the hands, it follows that three-fourths of their time, on the general average, these laborers are without employment, and cannot obtain it even at the lowest pittance which is even paid for it. These females are often as respectable and as deserving as any of the more wealthy—and who are indebted to the kindness of some relative or friend for a home. where if they eat the bread of dependence, it is at least received from kind hands. Without such aid, and with nothing but their wages of labor to sustain them, thousands of such females would starve, or be driven to live on public charity. Many among these are the widows or orphan daughters of highly respectable men—many even of men who had enjoyed wealth. And there is not a farmer in Virginia, whether rich or poor, who can feel sure that in two generations, if not in one, that some of his female descendents will not be in the same deplorable situation: a situation to a sensitive mind, which cannot be otherwise than most galling and distressing, however tempered and alleviated by kindness and affection. A state of dependence, when not so alleviated, condemns the poor woman to the unremitting toil of the day laborer, without his wages—to the subjection of the slave, without his freedom from care and mental suffering. This is the situation, in its various grades, in which thousands of the most industrious, virtuous, and deserving part of our population are placed—and the danger of which is pending over as many others, who are now growing up in hope and joy, cherished by affection, and supplied with every present comfort. And the beings who are condemned to this state, and who succeed each other in endless succession, and increasing in numbers and in wretchedness, form a portion, (and an equally deserving portion) of the "better half of the human race"—who as a class, are flattered, almost adored by men, and yet denied by their usages and institutions, the means of earning honest bread, and in numerous cases, are deprived of all the means of subsisting, except in a worse than slavish state of dependence—or in a life of infamy.

If we were neither husbands nor fathers—if we cared nothing for the situation of unfortunate females who are not connected with us by ties of relationship—still as members of the community, all men have a deep interest that so much of the country's capital of labor and talent, should not be kept idle and useless, and a source of expense, instead of profit and wealth to the nation.

POLECON.

July 3*rd*, 1835.

[Deeming that (for the present time) enough of argumentative writing against the policy of the existing law of enclosures, has been given to our readers, we have withheld from publication more than one such communication recently received. A similar course would have been pursued with regard to the following, but for the matters of practice contained, which present a different kind of claim to notice. The experiments would have been of more value as examples, however, if authenticated by the author's name, and would have served his purpose better as proofs of the positions maintained.]

For the Farmers' Register.

A WORD TO "FENCEMORE,"

Who in the May No. of the Register, Vol. III. page 47, "insists that agricultural reform calls for no legislative enactment—that the existing legal policy" (as regards fences) "throws no obstruction whatever in the way of the individual who sincerely wishes to place his stock management upon a profitable footing, and that he feels constrained to condemn all such attempts on the part of the legislature as gratuitous and uncalled for, and as oppressive in the extreme to the whole body of small farmers, who constitute so large a portion of the agricultural community."

"Agricultural reform calls for no legislative enactment"—and Fencemore seems to think that he has satisfactorily established this proposition, because he has adjudged that he would do better with just *double* the quantity of fencing now used —and as we are now *compelled by law* to have a certain extent of fencing, he would by no means remove this *compulsory enactment*, least, as it would seem, we should attempt to do with *less*, when it is his opinion we ought to have *more*. It matters not what other honest farmers may think, or to what conclusions their arithmetic may lead them. The *true interest* of the farmer, and his *sagacity* in pursuing it, is not enough to direct him in the management of his own private affairs—he must be made to keep up his fencing about his arable lands at all events, by "*legislative enactment*." Fencemore has demonstrated arithmetically (if indeed he has demonstrated any thing) that it will take as great an extent of fencing to enclose a proper number of lots for standing pasture and other purposes, upon an improving system, as is now used for the outside enclosure of our arable lands—and thus as nothing could be gained in the actual amount of fencing, supposing the present law of enclosures modified, (which by the by we do not believe) he concludes that nothing can be gained in any way—or because we should have to make fences around a few lots for pasture and improvement, we had as well make them around our whole plantations! Thus doubling our amount of fencing, and for what? Why, according to Fencemore, to keep "the country from being thrown into consternation and dismay by a drove of hogs or bullocks!!" Or at another place, because "it would be oppressive in the extreme to the whole body of small farmers," for the legislature to take away from them the power to turn their hogs and cows on their neighbors' fenceless crops. Or again, because "the annual *clearings* of the tobacco planter are utterly inadequate to his immediate demands," this tobacco planter must therefore be permitted to use the woods as a range for his stock, having no open land; thus entailing upon his neighbor, perhaps a cotton planter, with an abundance of pasture of his own, the enormous expense of keeping up double as much fencing as he ought to have. solely for the benefit of the tobacco planter's half-starved hogs and cows. This argument of Fencemore seems to us to afford but a poor "defence of the law of enclosures" —and we think it will be found to weigh still lighter against a few *stubborn facts* which we are now going to state, and which we think ought to go farther than arithmetic with the "whole body of small farmers," and that of the big ones too, to prove that it would be best for every man to live upon his own land, and within his own fences.

First. A few years past an ox was put into an old barn about the first of December—kept well littered and fed till the first of March following. Upon hauling out the manure, it was found that that taken from the barn was equal to that made by six of the *out cattle* at the pens; and it is believed to have possessed twice the strength that the pen manure did.

Second. Several winters past, six cows were milked—fed in the usual way with dry shucks scattered over the pen. The next winter two only were milked—fed throughout the winter upon one quart of meal each, morning and night, mixed with cut shucks, and wet with salt water. These last two gave *more* milk, and that richer, than the six gave the winter before. The next winter, but one cow was kept to milk, which was well fed with meal, cut shucks, and a few cotton seed. Her calf was killed, and she was milked three times each day. She gave nearly or quite as much milk as the two, or the six before kept gave, and was turned out in the spring quite fat.

Third. In the spring of 1834, ten shoats were put into a small pen, and fed through the summer upon clover cut from half an acre of land, together with one ear of corn each every day. They kept in good order, and at fattening time in the fall, were found in better order, and fattened upon less corn, than those that ran at large; although these had the same quantity of corn each day whilst out—one-eighth of these last having died from the time the ten shoats were put up. When killed and weighed, the ten hogs which had been put up in the spring as shoats, of the same size and age as these which were running at large, weighed from 27 to 35 pounds, each, more than the hogs which these last made, although fattened in the same manner. It was moreover observed, that at least *six times* as much time was required to look after the *out* hogs, as was required to feed and water those in the *pen*.

By these experiments then it would seem that we in fact gain nothing by permitting our stock to run at large, even as regards *their benefit*, to say nothing of the enormous expense which the present *ad libitum* system, as regards stock, entails upon the whole agricultural community. We have just seen that one cow tolerably well kept upon a man's own land, and within his own fences, is worth six running at large—that it will make him *more manure* than six—will be a finer animal than any of the others, and will bring him better calves. That his hogs may be kept up upon the same amount of corn; and with the addition of a little clover, will keep fatter, grow larger, be less apt to die; to be killed or stolen, and will give him more meat, and be fattened upon less corn than the same number running at large. And above all that time which, with industry, is a poor man's capital, is saved to him in the ratio of six to one, when he keeps up his hogs.

FENCE LESS.

June 30th, 1835.

GYPSUM NOT INJURED AS MANURE BY BEING HEATED.

To the Editor of the Farmers' Register.

Fairfield District, S. C., July 11th, 1835.

Impressed with the justness of a remark of yours, that "information obtained from statements in detail of agricultural experiments, is far more satisfactory to the attentive and laborious inquirer, than a mere report of the general opinions of the experimenter," and in accordance with that spirit, I now offer you a brief account of an experiment, which perhaps may not be uninteresting.

In the spring of 1834, intending to plaster a lot of orchard grass, I ordered a few barrels of gypsum from Charleston. As I had before found the process of pulverizing the stone rather troublesome, I requested my factor to purchase the gypsum already ground into powder. When the gypsum arrived, I was astonished at the high price it had cost me, to wit, six dollars per barrel; but not suspecting the judgement of my factor as to the quality of the article, I made no examination of it myself, but placed it entirely to the account of imposition. In June I had it spread over the grass at the rate of one bushel per acre. The very next day after having spread it, a plasterer who it seems had previously examined the plaster, called on me to ask the favor, as the article was not to be had in the Columbia market, of a barrel of it, to finish a job of stucco-work in which he was then engaged. I told him there was still a barrel on hand which he might have, but that it was raw gypsum, and that he would have to put it through the process called "boiling," before he could use it. He replied that it had already gone through that process, and was excellent plaster for his work. I denied the fact, as I had bought it for simply ground gypsum. He, however, instantly undeceived me; and convinced me, by working a little of it into plaster, that he was right; upon which he took the barrel, with which he finished his job of stucco-work.

As I had never seen any account of the application of gypsum in aid of vegetation that had undergone the process of heating, it at once occurred to me that I had probably destroyed my lot of grass. Reflecting a moment, however, upon the effect of heat upon gypsum, it was obvious that it had undergone no essential change in its component principles, except the expulsion of the water of composition. It was still the sulphate of lime in a more concentrated and condensed state; and as in this state its avidity for water is so prodigiously great, I concluded the first rain, or perhaps the dews, would soon saturate it, and re-convert it into its natural state of gypsum; and, therefore, I could not conceive how it could injure the grass, unless from an over-dose of gypsum in consequence of its greater strength to the bushel, of which I felt but little apprehension. In a few days afterwards, upon receiving one of the numbers of your Register, I was gratified to find you had opened a discussion upon the same subject, the first which I had ever seen; and so far, in the absence of any experiment, the same conclusion had been arrived at by yourself.

My accidental experiment, however, I think goes far towards settling the question. The grass never showed any signs of unhealthiness, or suffered in any way for a moment; but on the contrary, from the manner it sustained one of the severest droughts ever witnessed in August, and again the unparalleled cold of the last winter, and the manner in which it has subsequently flourished, and retained its verdure, I am satisfied the mistake was all in favor of the grass. I had applied gypsum to a part of the same lot in June of the year preceding. The benefits were very manifest, but not equal to those from the last plastering. In 1832, I applied it at the rate of about one bushel per acre of unheated gypsum, and it was my intention to apply only one bushel per acre in 1834; but by the mistake, as gypsum contains 22 per cent. of water, which had been driven off, I of course applied what was equal to one bushel and nearly a quarter of the unheated article; which the result has shown was not too much.

The great objection then to the application of gypsum that has undergone the process of heating, as a fertilizing substance, consists in the expense, and not in any deleterious or impaired qualities of it—which expense at the rate I paid, was far too great. The heated plaster cost me about two dollars per bushel, whilst I never paid higher than ten dollars per ton in Charleston for the gypsum in stone, and have bought it as low as seven dollars.

J. D.

P. S. As it is satisfactory, and generally useful to know all the circumstances attending an experiment, I will mention that the lot on which my grass grows is new land, on a ridge of pretty good soil, with a growth of oak and hickory, in Fairfield District. It is what we call clay soil mixed with a good deal of feldspar stones; but sufficiently silicious to be easy of cultivation. It is shaded by the natural growth of lofty oaks, &c., left standing about 50 and 60 feet apart. It has had no manure except two annual supplies of cotton seed, spread at the rate of two wagon loads (45 bushels each) to the acre. The grass is flourishing and profitable.

J. D.

From the Claremont National Eagle.

CANADA PLUMS.

The plum trees all over this section of the state and in the adjoining parts of Vermont present a most singular appearance. The fruit at this point of the season, unless injured in some way, should be about the size of a pea—perhaps not so large. But the fruit every where presents a most unnatural size, presenting rather the appearance of green lemons than anything else we can remember, swollen, wrinkled, and puffed up, some long, others round, an inch long and nearly as thick. They are of a bright green or yellow color, tinged with a beautiful scarlet on the outside, while they are completely empty within. This fruit—the large red plum—in the natural course of vegetation is at this time, as we remarked, about the size of a pea; and those who have plum trees, as there are many on the Connecticut, are exceedingly puzzled to account for this state of things. We had a branch brought to this office from Cornish which really has a very curious and singular appearance. We are informed the trees have some ten years back suffered in the same way, but the cause is a mystery. Nothing like a worm is to be found in the swollen fruit.

From the United States Philadelphia Gazette.

YOUNG'S PATENT SPARK CATCHER FOR LOCOMOTIVE ENGINES.

Mr. Editor—At a time like the present, when the extension of rail roads throughout our country is becoming so general, and the employment of locomotive engines has become a matter of course, I deem it important that all persons connected with the management of rail roads should be made acquainted with the fact, that a complete remedy exists for the greatest nuisance to which this mode of travelling is liable, viz: the emission of sparks from the engine. That remedy is to be found in the contrivance with the name of which this article is headed, and the patentee is prepared to dispose of the right of using it, either at a reasonable rate for each engine, or at a gross sum, to be paid for the privilege by each company that may be desirous of availing itself of his invention.

It is now upwards of two years since the spark catcher of Mr. Young* has been in use on the New-Castle and Frenchtown rail road, since which period no instance has occurred on that road of a single garment having had a hole burnt in it by a spark from a locomotive engine. Of the tens of thousands of persons who have travelled the New-Castle road during the period named, not one can be found to gainsay the above statement.

Is there a single person, who has travelled on any other road in the United States, on which locomotives are used, with wood for fuel, that has not been annoyed, and either had his flesh or clothing burnt during his journey, by the means I have mentioned? I do not believe there is one to be found.

Is the Camden and Amboy road free from the intolerable and dangerous annoyance? No!—Baggage cars have been burnt, passenger cars have been on fire, and ladies almost denuded.

Is the great thorough fare of Pennsylvania, the Columbia rail road, free from it? No! Barns, wood, crops of grain, and fences, have fallen beneath the flames in turn.

Are the Philadelphia and Trenton, the Philadelphia and Germantown—in a word, are any of our rail roads in the whole country, from Maine to Louisiana, provided against the inconvenience and danger of which I am speaking? No! not one.

We have arrived then at this point; the greatest drawback to the pleasure and safety of travelling on rail roads with locomotive engines, is fire emitted from the chimnies of the engines, and against this a perfect preventive exists, the right to use which may be obtained by any company that see proper to purchase it, at a reasonable price. One company only in the United States has availed itself of it. The question for the public to decide is, whether they will suffer this sort of carelessness or false economy to prevail in rail road boards any longer, and allow their own property and lives, and those of their wives and children, to be jeoparded, or whether they will resolve with one accord to prosecute in all cases of damage the company that undertakes to convey them safely without taking the proper precautions to do so.

The writer of this article is as ardently attached to the rail road system as any man in the country. He has long looked on the monstrous abuse, he is now noticing, in silence, but a solemn sense of duty, quickened by a recent signal illustration of the danger to which life is subjected by neglect in guarding against the particular evil of fire, has at length urged him to break his silence.

And I hope that this brief notice may induce a general attention to the subject, which is one, in my humble judgement, of paramount importance both to the corporations alluded to, and the public.

One word more. The assertion is distinctly made, and all contradiction of it defied, that Young's Spark Catchers are a perfect preventive to the emission of sparks from the chimnies of locomotive engines when in use. I believe it might be asserted with equal safety, that no other contrivance has been found to answer at all.

L.

June 16th.

* Mr. Young is the engineer of locomotive power on the New-Castle and Frenchtown road, and resides at New-Castle.

TO DESTROY LICE ON CATTLE.

To the Editor of the Farmers' Register.

In the June number of the Register, I perceive several modes recommended for destroying lice on cattle, each perhaps, efficacious, but with some objections: and as we cannot have too many remedies for the destruction of that pestiferous insect, allow me to recommend the use of a little flour of sulphur, given internally, once or twice a week, with salt, which is eaten kindly. This I have practised with great success.

In addition to the beneficial result in destroying the lice, it has the happiest effect on the general health of the cattle.

H. H. C.

For the Farmers' Register.

SUPPOSED MISTAKE AS TO HESSIAN FLY.

Essex, July 22, 1835.

From the severity of the winter and the destruction by what we term the fly, our crops of wheat are reduced to about one-third of a crop. I have, on examining the stalks of wheat during the spring, seen a great number of deposites near the root; and at the approach of summer I found they had all matured, and deserted their winter quarters. I have looked diligently for the Hessian fly, but can see nothing but an innumerable quantity of grasshoppers of the smallest size. Indeed from the slight observations which I have made on this subject, I am brought to the conclusion, that we may probably be condemning the one for the fault of the other. I would beg, therefore, should any of the writers for the Register make a farther experiment with this deposite, that they will keep the insect till they are thoroughly convinced whether in fact it be the Hessian fly or not, for between the grasshopper in its youngest state, and the Hessian fly, there is a striking resemblance.

H. H. R.

EXPERIMENTS WITH LIME AS MANURE.

To the Editor of the Farmers' Register.

Norfolk Co., July 6th, 1835.

In my first acquaintance with the use of lime, I was almost driven from a further trial of it, by its contrary effects; but I candidly admit that my expectations were founded upon gross ignorance of the proper manner of using it, for I ought not, upon neither rational nor scientific principles, to have expected a different effect after the manner of use.

I will give you a history of my mode of application and its effects, if you can have patience enough to follow me, for I really expect you to be, tired reading such crude unpolished stuff as I am truly ashamed of myself: but the experiment is correct. If my pen has a poor faculty of relating it, your repeated assurances that doctrines when founded upon correct observation, was the greater object of your solicitude even if clad in homespun language, have spurred me onward to give you this desultory statement. In the spring of 1834, a very poor lot of land containing 15 acres, rather on the sandy order, what is termed by your Essay a sandy loam, was divided in two equal lots of 7½ acres each, both to be seeded in red clover to experiment from, with lime and plaster separately. As my knowledge of the effect of either, was rather vague and visionary, I determined to improve it if I had to pay rather dear for my whistle. Consequently 500 bushels of well burned shells was set apart for the lot for liming, and from 20 to 25 bushels of ground plaster was set aside for the lot for plastering. After the lot for lime received its first fallowing, it was checked off carefully at different distances so as to vary the quantity when spread from 40 to 120 bushels per acre, a bushel of the shells was put down in each check, and carefully covered over with earth until they had perfectly slaked, and then spread as regularly over the surface as possible. The other lot received a light broad cast of rich dunghill earth, and seeded both lots about the middle of February in red clover, prepared as neatly as a harrow and roller could do it. In March following, the lot destined for plaster, received its first due 1½ bushels to the acre sowed on a damp day, and the next plastering after the first cutting of clover was taken from it: the two lots were left to time and seasons to unfold their wonders. The limed lot with a good grass season did manage to admonish the passer-by that red clover seed had been sown there. The other yielded in the month of July, a very fine cutting of hay. So much for my first attempt. The difference was so very striking that it awakened in me an anxious inquiry. I commenced to read—for until then I looked upon a book on agriculture, like the laymen did the Bible in the darkest days of popery, to be touched at the risk of ruin. I had embraced the ruinous idea so common, and yet so fatal to my countrymen, that book knowledge was prejudicial to profitable husbandry: but I soon detected my error, and determined to carry my experiment with lime still farther. So, last October I carted on the lot 500 loads of good farm pen litter, and spread it broad cast, then seeded it again with wheat and red clover at the rate of 1½ bushels of wheat and 5 quarts of red clover seed to the acre. Now comes the bright side of the picture. The wheat (on land before almost too poor to produce any thing) stood on an average, from 5 to 6 feet high (though a very bad season for wheat;) and I verily believe, could it have been prevented from falling down, the yield would have been from 175 to 200 bushels. I know not the exact quantity I have saved, not having yet thrashed it all out, but it will not fall much short of 175 bushels, and the waste was considerable. The clover bids fair to excel the other lot, though the yield from the plastered lot was not inconsiderable, as the first cutting this season averaged from three to four feet in height, and is now fit for the scythe again. So much for lime and plaster. Many of my neighbors when passing these lots look puzzled. The cloud of ignorance which has so long obscured Eastern Virginia is gradually disappearing before the effulgent rays of your agricultural pioneer the Farmers' Register, for such I hail it in this section of the country.

Whilst my hand is in I will give you some account of a small crop of corn which I have growing, and for a more appropriate name will call it the experiment crop. I do not expect this to excel or even to compete with overgrown crops that have been made at the north; because the number of stalks to the acre is not great enough to afford the requisite number of ears: but I am not so certain but what corn might be planted thick enough to afford to the acre as great a product as has been raised at any other place. The land the crop is now growing on, was originally very poor, but was made rich for a crop of the skinless oat: being disappointed in obtaining them, I determined to plant it in the extra prolific or twin corn, which is said to produce from five to eight ears to the stalk. The corn was planted on a deep trench filled with rich dunghill earth three feet by eighteen inches, and the corn covered with an equal combination of leeched and unleeched ashes: it was with great difficulty that the corn was made to stand from the caustic effects of the ashes, but the whole is growing finely and bids fair to produce well. If it does not suffer from being too thick, the yield must be considerable: the result, if deserving of public notice, you shall hear as soon as ascertained.

A. S. F.

From communications to the Board of Agriculture.

OBSERVATIONS ON THE UNITED STATES OF AMERICA.

By William Strickland, Esq. of Yorkshire. Received 8th March, 1796.

[Concluded from p. 211 Vol. 3.]

VIRGINIA

Is the southern limits of my information in America; beyond it inquiries were unnecessary, because it appears as if agriculture had there already arrived at its lowest state of degradation.

The usual crops, in this state, are maize and wheat alternately, as long as the land will produce them tolerably well; then in future after the two crops, three or four years rubbish pasture; and in parts where tobacco is cultivated, several crops of it are taken on first clearing the ground, before any grain is sown upon it; now and then a crop of oats intervenes, perhaps instead of wheat, perhaps following it; clover and lucern are yet little known, though there is reason for supposing that they would be as beneficial here, as the first is, in the other states, or perhaps more so; since, on account of the increasing heat of the climate, pastures and meadows are more precarious, and less frequent. Where crops of wheat, of not more than five or six bushels per acre, are expected, it is not usual to sow more than half a bushel of seed, and no where in this state more than one bushel. The average of all that part of Virginia lying east of the Blue Ridge, I am satisfied I state at the utmost, at seven bushels per acre; no one states the average of that extensive flat country in Virginia, lying below the head of the tide, at more than five or six bushels; it therefore requires much better crops in that naturally fertile, but worn out, and not extensive tract of red land, at the foot of the mountains, to raise the average to seven bushels. In those fertile and beautiful vallies that lie among the mountains, in which ignorant cultivators have not yet resided sufficiently long to have entirely exhausted the soil, favored with a temperate and delightful climate, it yet produces crops equal to any in America; I have reason to believe not less than twelve bushels per acre; but the surface, capable of cultivation, when compared with the rest of Virginia, is very small indeed: with the country beyond them I am unacquainted. The average of maize, in the eastern part of Virginia, is not to be reckoned at more than fifteen bushels; of the vallies, at twenty bushels; of oats, from one and a half to two bushels of seed to the acre, will be a return of from twenty to thirty.

All the back country of America is very favorable to the growth of rye; crops, producing from twenty to thirty bushels, are commonly met with; this grain is entirely consumed in the distillation of whisky, chiefly for the consumption of the Irish frontier-men, except among the Germans in Pennsylvania, who use it for bread.

Much of the wheat of this state is of a very inferior quality, some so bad as scarcely to be of any use, though that which is good, naturally much resembles the wheat of Maryland; but the slovenly management of the farmers considerably lessens the value of it.

The use of the flail is scarce known here; almost all the wheat is trodden out in the field by horses upon the bare sandy soil, with which much of it gets incorporated, and afterwards is separated from it by sieves, or some other means that answer the purpose; the consequence of this is, that a considerable quantity of dust adheres to the surface of the grain, and insinuates itself into the groove on one side of it, so that no art can entirely clear it away; and thence I am told millers are unable to make superfine flour from Virginian wheat; and on that account, that it bears a price, inferior to what the quality would otherwise demand. A weevil, or some other insect, greatly infests the wheat of this state when in the straw, which makes it necessary to tread it out as soon as possible after harvest; and this is frequently attended with inconvenience and loss. In unloading the wheat of this state from shipboard, or otherwise working among it in the granaries, the people employed are frequently so affected with a *prickling* or *nettling* on the skin, as to be unable to go on with their work, but without being able to account for the cause of it. I recollect a similar circumstance happening, in unloading a vessel laden with Virginian wheat, some years since at Liverpool, when it was said to be caused by a minute insect. Oats are not extensively cultivated in any part of America, and are every where bad, but those of this state, of the worst possible quality: they have certainly kernel sufficient to enable them to vegetate, but are, notwithstanding, light as chaff. The cultivated oat appears again returning to the original grass. I never saw any oats that would be marketable in England, except some in the German tract in Pennsylvania, and they would admit of comparison with such only as we should esteem very moderate.

I am unable to discover how profit is to be derived from such crops, unless, that people being actually possessed of the soil, and of the slaves to cultivate it, abandoning all expectation of profit for their capital, look upon all as nett profit that is received from the land. The land owners in this state are, with few exceptions, in low circumstances; the inferior rank of them wretched in the extreme. The evils of slavery are now rapidly and forcibly recoiling from the slave upon his owner. Tobacco and maize, which heretofore have been the curse of the slaves, are now, with the slaves, allowed by all men in Virginia, to have been the ruin of themselves and their country: the almost total want of capital, among this description of people, forbids all improvement on a great scale, and want of the knowledge of agriculture, prevents its slow but certain progress. To show what some of this land would submit to before it became exhausted, and the mode pursued to accomplish it, I will take the cultivation of a gentleman, possessing a considerable tract of land, originally as fertile as any in nature, on the foot of the Blue Ridge, who complained that much of his estate was worn out. After clearing and burning the woods, seven crops of tobacco were taken, in as many years; in some instances, ten crops; four crops of wheat; and ten crops of maize and wheat alternately, in ten years. After twenty-one years, the land refused to yield any more grain; but in a twelvemonth, too benignant nature clothed his property with a matchless sheet of white clover.

To such modes of cropping, the poverty of the people, and sterility of the soil must be attributed: crops may be seen where each ear, frightened at its neighbor, keeps that awful distance, which would admit of a person's walking through the field without breaking down a stalk, in a climate and soil well calculated for the produce of wheat. In many of the states, the Hessian fly bears the blame, which, if properly placed, ought to stand to the account of the ignorant and greedy land owner; but no one pretends to say, that this insect has committed any material (if any) depredations on this state.

RECAPITULATION.

	Average produce of wheat.	Maize.	Buckwheat.
	Bushels.		
In the state of New York,	12 per acre	25	15
Jersey, Pennsylvania, Delaware, Maryland,	8 ditto		15
Virginia (east of the Blue Ridge,)	7	15	25 oats
Ditto (west of ditto,)	12	20	25

The average of the above, according to the number of districts, is nine bushels and three-quarters of wheat per acre; but as the first and last district, which are the most productive, are considerably less in extent than the two which are the least productive, the average of the whole, in proportion to the extent of surface, cannot be estimated at more than nine bushels per acre; to the other crops it is not necessary to pay attention. Now, that a country situated in the finest latitudes of the globe, with a soil certainly, by nature, as capable of producing, as the climate is of bringing to maturity, far greater crops, and certainly, in both respects, better calculated for grain than many parts of Europe, which produce from double to treble the quantity on an average, should yield crops which there, would be looked upon as scarce worth the collection, renders the cause of it deserving of our notice.

When inquiring into the subject, among the most intelligent people of the different states, I found this inferiority pretty generally attributed to a deficiency in the vegetative powers of the soil: it was said that a country, fresh out of the hands of nature, was not fertile; that it would bear a few tolerable crops when first cleared, but soon ceased to do it; and that it required the cultivation of ages, to render it as fruitful as old countries; so little were the best informed aware of their own defects, or the merits of the soil, or willing to acknowledge either of them. Some of the northern states, who remembered the days of greater fertility, attributed the visible decline to the depredations of the Hessian fly; but in Virginia, they scarcely know this insignificant animal, and therefore on it cannot cast the blame; and Virginia has probably experienced a greater failure of crops than any other state. In Virginia, this gradual decline has not injudiciously been ascribed to the culture of tobacco and maize; the first it has been observed, enriched the planter, but ruined the soil; the last ruined both; but the culture of tobacco and maize, as the staple articles of the country, has only been partial, being confined to some of the southern states, while the decline has pervaded the whole of them; therefore, however injurious these may have been, we must look deeper for the root of the mischief: that I venture to state, as likely to be found in *the present constitutions of the states, and the manners of the people.*

Before the revolution, I have reason to believe that the average produce of the soil would have stood considerably higher than at present, and there is no doubt that the owners of it were more opulent: at that time, the capital of the country was vested in the lands; and the landed proprietors held the first rank in the country for opulence and for information, and in general received, the best education which America, and not unfrequently Europe, could afford them; their estates were sufficiently extensive to make it worth their while to bestow their time and their money upon them; and the estates in return repaid with interest the attention and expense. The law of England* generally prevailed with respect to the descent of property; an aristocracy was formed of capitalists, well calculated for improving, cultivating, ornamenting, and enriching the country; great exertions and great improvements cannot be made in any country but by persons of this description; and no country requires such exertions and such improvements, as a *new one.* Since the revolution, a new order of things has taken place; new people, and people of very different occupations and pursuits, have taken the lead in the government, both of the confederation and respective states. The capital, as well as the government of the country, has slipped out of the hands of land owners; and these new people are now employed in very different, and, in the present state of things, more productive speculations than the cultivation of lands; in speculations frequently at variance with the best interests of the country. In some of the states, the gentlemen of landed property have passed into perfect oblivion; in none of the states do they bear the sway, or even possess their due share of influence, except perhaps in those of New England; and there, they only take it incidentally, as the lands are divided with much equality among every description of people, and are rather a secondary object, even with the principal people of the country, who generally, with a small occupancy of land, are obliged to follow other more lucrative pursuits, on which they place their chief dependence.

Before the revolution, real estates descended to the eldest son; the law, since that period, has ordained an equal division of them among *males and females* in equal degree, except in one or two states, where the eldest son takes two shares. This law has already had a very extensive, but a very mischievous influence; it has had the effect which the authors of it intended, in introducing a greater *equality among the people*; but it has had another also, which they might not have foreseen, and could not have intended; that of reducing them to *an equality of poverty, and their soil almost to a Caput mortuum.* Fewer people of landed property of any considerable opulence, are to be met with, than heretofore, and their numbers must be continually diminishing, from the influence of this law of descent; for though some people will not from custom acquiesce in it, and the wisest, from

* In the state of Connecticut real estates were always divided, as at present, among the children, male and female, the eldest son taking two shares; the evils, however, of minute division of real property, are there fully perceived and felt at this time.

a sense of the evils arising from it, which they already feel and lament; yet the law will occasionally have its course; and the estate once divided, can never again be united. The consequence of this is, that landed property is no longer an object of profit or pleasure; few choose to possess more than is necessary for their own convenience; fewer live in the country than heretofore; no houses, in many parts of the country, of any consideration, are building; and no improvements of any kind taking place. With the decline of this class of people, and their property, is also that of the produce of the soil; for the poor and the ignorant must unavoidably wear it out; the opulent and the intelligent alone can improve and ornament their country, and increase the produce of it. Such is the operation of the new constitutions on the higher orders; and it will be found, that manners too, have their full influence on the inferior orders; the mass of those we should call planters or farmers, are ignorant, uneducated, poor, and indolent: such an one who possesses an hundred acres of ground, will not in stock, furniture, or property, be worth £60; were he to possess such a capital, he would be esteemed a person of considerable substance; but he *boasts of his independence, and enjoys inaction.*

Of the people of this, and of inferior ranks, ease is the greatest bliss, and a frolic the greatest spur to activity; with such inclinations, labor will afford but a bare subsistence; and with this, such people will sit down contented rather than toil. From this picture, must be entirely excepted the people of the New England states; they, with a more rational love of independence, possess also an equal love of industry and order; consequently this exemplary and enterprising people, enjoy the natural attendants of such principles, knowledge, wealth, and power, in full proportion to their respective stations. The consequence of this state of things cannot be otherwise, than that the produce of the country must be stationary, if not on the decline; and that the supplies hereafter to be drawn from this, by other countries, cannot be greater, if so great, as they have been, unless some sudden and very material alteration of public principles and private practice should take place. It may account also, in part, for the excessive price which a demand not excessive, and no very great supply, has created in most articles of export from the United States, and especially within the last two or three years; and it may perhaps also appear, that this increased demand, and excessive price, have not materially added to the quantity exported* of articles

* The following is an account of the export of the staple articles of the United Sates, in the first and last years, in which it can at this time be obtained; in the first year, public disturbances in Europe had not had any material influence on commerce; in the last, a vigorous and general war had called for all the supplies that America could afford.

Year ending Sep. 30.	Maize. Bushels.	Tobacco. Hogsheads.	Cattle.	Horses.	Rice Tierces.	Flour. Barrels.	Wheat. Bushels.	Beef. Barrels.	Pork. Barrels.
1790	2,102,137	118,460	5,406	8,628	100,845	724,623	1,124,458	44,662	24,662
1794	1,472,700	72,958	3,495	1,828	*134,611	828,405	696,797	97,779	47,242
Loss,	629,437	32,402	1,911	6,800			427,661		
Gain,					33,766	93,782		53,117	12,780

* The return of this article being defective in 1794, that of 1793 is here taken.

The United States are therefore

Losers.

	Dollars.
By maize, at ½ dollar per bushel, -	314,718,5
By tobacco, at 40 dollars per hogshead,	1,416,080
By cattle, at 20 dollars each, -	38,220
By horses, at 40 dollars each, -	272,000
Buckwheat, at 1 dollar per bushel, -	427,661
	2,468,779,5
	1,657,982,25
	Dollars—810,697,25

Gainers.

By rice, at 18 dollars per tierce, -	607,788
By flour, at 6½ dollars per barrel, -	609,583
By beef, 6¼ dollars ditto, - -	331,981,25
By pork at 8½ dollars ditto, - -	108,630
	Dollars 1,657,982,25

The dollar 4s. 6d. sterling.

Therefore, though a bounty from 50 to 100 per cent, has been offered on the export of their chief articles of produce, in that great increase of price that was paid for them in 1794, yet in five years the United States have declined in the value of their export to the amount of upwards of eight hundred thousand dollars, according to the peace price. The price has augmented the export of articles of chief demand by the belligerent powers, but an immense loss in other articles, the produce of their soil, so as to leave the above great balance against the owners of it. If this be fairly stated, and the writer apprehends that the authorities from whence it is derived, cannot be disputed; surely it behoves the government of the United States to pay more attention to the landed and agricultural interests of their country; to remedy principles of law, so destructive to them, to occupy their minds on certain and immediate benefits, rather than attend to uncertain and distant speculations, before habits have become fixed in the mass of the people, which cannot afterwards, when wanted, be counteracted; before the principal people have abandoned a country life, as no longer affording them an occupation worthy of their attention; before their estates cease to be objects of rational pleasure, by being split into portions no longer worth possessing; and before they feel that their property and pursuits no longer afford them that influence, which their rank in society ought to give them.

of primary necessity to the countries demanding them, which they would have done, had the supply been naturally adequate, or capable of being forced.

"The husbandry of every country depending mostly on the market for cattle and sheep, and wool; how far is the bad culture of America owing to a want of them? Is there a demand for beef, mutton, and wool, in any quantities for exportation, or otherwise? And how far does the existence of these circumstances, in the vicinity of large towns, remedy such bad cultivation?

The answer to this has, in a great degree, been anticipated in the answer to the last question: what further is requisite, will be found in detailing the prices of articles in the different parts of the country when I was there.

1794, September. New York city. Beef, $3\frac{1}{2}$ $\frac{3}{16}$d. to $3\frac{3}{4}$ $\frac{1}{16}$d.; mutton, $3\frac{3}{4}$ $\frac{1}{16}$d.; veal, 5 $\frac{1}{16}$d. to $5\frac{1}{2}$ $\frac{3}{16}$d.; lamb, per quarter 2s.; pork, 5 $\frac{4}{16}$d.; pigs, live weight, $2\frac{1}{4}$d. per lb.; butter, 1s. $1\frac{1}{2}$d. new milk $3\frac{3}{4}$ $\frac{3}{16}$d. per quart; chickens, 10d. to 1s.; hay, £2 5s. to £2 16s. 3d. per ton; wheat. 5s. $7\frac{1}{2}$d.; barley, 3s. $11\frac{1}{4}$d.; maize, 2s. $9\frac{3}{4}$d.; rye, 3s. $1\frac{1}{2}$d.; oats, 1s. $8\frac{1}{4}$d.; per bushel.

New York State. Beef, 3 $\frac{6}{16}$d.; mutton, $2\frac{3}{4}$ $\frac{4}{16}$d.; butter, 9d.; wheat 5s. 4 $\frac{3}{16}$d.; pair of good oxen, five or six years old, from £13 10s. to £14 12s. 6d.; three years old, £6 15s. per pair. Fat sheep which may weigh 14lbs. per quarter, 6s. 9d. each; wool of good staple 4lbs. per fleece, 1s. $5\frac{1}{2}$d. per lb.

1794, October. Albany. Beef and mutton, $2\frac{3}{4}$ $\frac{4}{16}$d.; butter. $8\frac{1}{4}$ $\frac{12}{16}$d.; wheat, 5s. $9\frac{3}{4}$d.

1794, November. New England. Beef and mutton, $3\frac{1}{2}$d.; butter, from $8\frac{1}{4}$d. to $10\frac{1}{2}$d.; wheat 6s. 9d.; a drove of lean cattle going into Pennsylvania to be fed, some of which cost £18 a pair; and when fat would weigh 1500 lbs. or upwards, hide and tallow included.

About Chesterfield and Massachusetts, the best sheep in the United States, weigh as high as 20 lbs. per quarter, fleeces as 7 lbs. each, long wool but coarse, used for combing, sells for 2s. 3d. per lb. In Rhode Island, extremely fine wool fleece, from $1\frac{3}{4}$ lbs. to 2 lbs. sells for 1s. $1\frac{1}{2}$d. per lb. unwashed; hay, £1 10s. per ton.

Boston. Beef and mutton, $4\frac{1}{2}$d. per lb.; butter, 1s.; butter in barrels, from $8\frac{1}{4}$d. to $9\frac{3}{4}$d.; used to be 3d. and $3\frac{3}{4}$d.; geese, 2s. to 2s 3d.; turkies and fowls $4\frac{1}{2}$d. per lb. ready for the spit. Cattle for the *curing-houses* in all parts of New England, in the drove, calculated at 18s. 9d. per hundred lb.: hide and tallow included. Beef from 31s. 6d. to 45s per barrel of two hundred pounds nett each, according to quality; the first is very bad, the last excellent; the demand is far greater than the supply, pork per barrel, not surpassed by any in the world, 72s. to 76s.

1794, December. New York City. Wheat, 7s. 10 $\frac{1}{2}$d.

Philadelphia. Beef $4\frac{3}{4}$ $\frac{1}{5}$d. to 7 $\frac{4}{5}$d.; mutton and veal, $3\frac{1}{2}$ $\frac{2}{5}$d. to $5\frac{1}{4}$ $\frac{3}{5}$.; best flour, 38s. 3d. per barrel, of 1 cwt. 3 quarters nett; wheat 8s. $4\frac{3}{4}$d.: best timothy hay, £3 12s. per ton; maize, 2s. $8\frac{1}{4}$ $\frac{2}{5}$d. butter 9d. to $10\frac{3}{4}$ $\frac{1}{5}$d.; milk, $4\frac{3}{4}$ $\frac{1}{5}$d. per quart; bread of superfine inspected flour, 1 lb. 7 oz. for $3\frac{1}{2}$ $\frac{2}{5}$d.; of inspected common, 1lb. 8oz. for ditto; of inspected rye, 2 lbs. 3 oz. for ditto.

1795, January. Common meadow hay, £3 per ton; best timothy, £4 10s.

March. Wheat 9s.; flour, 47s. 3d. per barrel; fowls, 3s. to 4s. 6d.; ducks, 5s. $8\frac{3}{4}$d.; butter, from $10\frac{1}{4}$ $\frac{1}{5}$d. to 1s. $1\frac{1}{4}$d.

Prices current at Trenton, the depot for Philadelphia; wheat. 9s.; rye, 4s. $9\frac{1}{2}$ $\frac{2}{5}$d.; maize, 3s.; oats, 1s. $9\frac{1}{2}$ $\frac{2}{5}$d.; buckwheat, 2s. $8\frac{1}{4}$ $\frac{3}{5}$d.; ditto meal, 4s. $9\frac{1}{2}$ $\frac{3}{5}$d. per hundred lb.

May. Virginia, most part of the state. Beef, 2d.; mutton, $2\frac{1}{2}$d.; wheat, (east of the Blue Ridge) 6s. 9d.; flour, 36s. per barrel: maize, 1s. $8\frac{1}{4}$d. per bushel; wheat (west of the Blue Ridge,) 4s. $1\frac{1}{2}$d.; flour. 25s. $1\frac{1}{2}$d. per barrel: rye, 3s. $4\frac{1}{2}$d.; maize, 2s. $7\frac{1}{2}$d. Richmond. Beef. $4\frac{1}{2}$d.; mutton, 6d.; veal, $8\frac{1}{4}$d.; lamb, 5s. 3d. per quarter; wheat, 7s. 6d.; flour, 42s. 9d. per barrel.

June. Maryland, Baltimore. Beef, mutton, and veal, according to quality, from $5\frac{1}{4}$ $\frac{3}{5}$d. to 7 $\frac{1}{5}$d.; butter, 1s. $2\frac{1}{4}$ $\frac{3}{5}$d. to 1s. $4\frac{3}{4}$ $\frac{1}{5}$d.; wheat, 9s.; flour, 49s. 6d. per barrel.

July. Philadelphia. Wheat 10s. $2\frac{1}{4}$ $\frac{3}{5}$d.

New Jersey. Mutton and veal, $3\frac{1}{2}$ $\frac{2}{5}$d.; beef scarce at this season; butter, $11\frac{1}{2}$d.

New York City. Beef and mutton, $6\frac{3}{4}$d. and $7\frac{3}{4}$ $\frac{3}{16}$d.; veal somewhat cheaper; butter $11\frac{1}{4}$d. and 1s. $0\frac{1}{4}$ $\frac{4}{16}$d.; wheat, 9s. 10d.

From the above detail of prices, it will not only be evident, that the demand for exportation must be greater than the supply; but that the consumption of the great towns, affords a price more than sufficient for all the articles that are carried to them. A very large proportion of the supply, both for exportation, and the consumption of the large towns, is brought from very great distances: cattle from the Chinessee country on lake Ontario, and from Kentucky, into the neighborhood of Philadelphia; the former not less than six hundred miles, the latter about seven or eight hundred. The chief part of the flour comes in barrels, from the heads of the rivers that fall into the Atlantic; and some by land carrige, from the neighborhood of Fort Pitt to Philadelphia, a distance of three hundred miles. That a supply in itself moderate, when compared with the vast extent of country, should be collected from such great distances, is sufficient proof that the large towns have not beneficial effect on, or power to remedy, the bad cultivation of the country, even in their own vicinity.

"It is said that all the better soils in the central states, when exhausted and left, cover themselves with white clover; ascertain the fact; and observe what soils they are, upon which this fact occurs most."

In every part of America, from New Hampshire to Carolina, from the sea to the mountains, the land, whether calcareous or argillaceous, whether wet or dry, whether worn out or retaining its original fertility, from the summit of the Allegany ridge to the sandy plains of Virginia, is spontaneously covered with white clover, growing frequently with a luxuriance and perfection that art can rarely equal in Europe. In the northern States, it affords an herbage throughout the year; in the southern, the seed ripens about July; after which time the heat of the sun scorches it up, and I believe it is no more seen till the spring following. The climate or soil, or both, seem particularly favorable to this genus of plants; the *trifolium repens, pratense, arvense, alpestre*, are abundant, and several others are to be met with. It is probably too late now to ascertain whether white clover be a native of this, as well as the old continent.

I am told it is never met with far back in the woods, but immediately on their being cleared away, either by fire or otherwise, it takes possession of the ground; which should prove that it was natural to it; that the seed lies there, but cannot vegetate till the ground is cleared: but again I have been told, that by some tribes of Indians it is called white man's foot grass; from an idea, that wherever he has trodden, it grows; which should prove at least, that it had not been known in the country longer than the white man.

"Timothy produces immense crops in America: would it not be worth while to try some of the seed in England, and to sow it on the same kind of soil?"

Timothy grass* is extensively cultivated in the middle and northern states of the American Union, and I apprehend it to be the same as the *phleum pratense*, cat's-tail grass, of European botanists. I have frequently seen extraordinary crops of it, growing thick as it could stand on the ground, 3 or 4 feet in height, and in some instances coarse as wheat straw, however, in this state, as it is cut before maturity, and as in the climate of America hay is always well cured, however succulent at the time of cutting, horses prefer it to every other kind of hay, and thrive better upon it. I cannot therefore but think it worthy of some fair experiments in this country. No other grass approches it in produce; and it is particularly useful when mixed with red clover, in preventing it from falling too close to the ground.

"Clover seed from America ought to be tried, particularly on ground that is tired of English or Dutch clover seed: can such be procured?"

Clover, growing with such remarkable luxuriance as that in America, must produce good seed, and such may prove an useful change. Seed has frequently been sent from America to England; probably will be sent in future without any particular demand; and will hereafter be certainly sent, whenever ordered or required here. The price at New York in the autumn of 1794, was about 7d. per lb.

"Might not Great Britain be supplied with hemp from America?"

No supply of hemp can be drawn from the United States, since the quantity grown there is very inconsiderable, near the whole of their consumption being imported from the Baltic. No country seems better calculated for hemp than the states, as far south as the southern boundary of Virginia; beyond that, the climate is too hot for it: every where to the north of this, in every waste spot, hemp grows spontaneously, with a luxuriance I never met with elsewhere: I have seen single plants upwards of ten feet in height, with branches in every direction four or five feet in length, and with a stem more than four inches in circumference. I do not mention this kind of growth as an excellence in the hemp, because such branching would be injurious to it, but to show how congenial the climate and soil is to the plant: such excess of vegetation would be prevented in cultivation, by the closer growth of the plants.

Kalm, in his travels in America, remarks the luxuriant growth of wild hemp, particularly about the remains of Fort Saratoga, (by which I suppose he meant Fort Hardie, formerly built by the French at Saratoga;) at that very place, upwards of forty years* afterwards, I saw hemp at least eight feet in height growing wild, which probably had annually shaken its seed, and annually grown from that time to the present.

Notwithstanding this natural inclination in the soil to produce hemp, next to none is cultivated; this probably arises more from the indolence of the people, than any other cause. Hemp affords much labor in the winter, on which account it would be particularly valuable to an industrious people; but here, particularly the reverse. Winter is the season of frolic and dissipation, with which nothing must interfere. These habits do not appear likely soon to be eradicated, and till that change takes place, no hemp will be cultivated. American hemp is said to be peculiarly soft, silky, and pliable; and therefore better adapted than any other, for the running rigging of ships, and it is used for that purpose in most American vessels.

Hemp is said to be much improved in its brightness and silky quality, by being rated [rotted] in brackish water, which is always the case in America when possible: experiments of that nature, might in many instances be tried in this country.

While the United States were under the dominion of Great Britain, bounties were offered for the raising and exporting of hemp, but I believe with little effect; and are at this time continued by the state of Massachusetts, but with so little tendency to increase the culture, that the bounty for not more than one hundred tons, has been claimed in a year.

"Might not immense quantities of oil-cake for manure, and the feeding of cattle, be got from America?"

The only oil-cake† used for manure is the resi-

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* (1799.) I have cultivated the American Timothy grass, and English cat's-tail grass, in my garden for three years; and I find not the least difference between them, except that the timothy is about a fortnight earlier than the cat's-tail; the effect of the change of seed and climate. They are the *phleum pratense* of the variety g. *nodosum* of Withering. This variety, I find, is not well founded, as the bulbous root is acquired both in the timothy and cat's-tail, by luxuriant growth; and the bulbs or knots on the roots become larger and more numerous by age; young plants, and those stinted in their growth by a poor soil, have them not. The bulbous cat's-tail, is not common in meadows, at least in this part of England; but where found, is in patches in most rich ground, and is always productive of an heavier crop than any other part of the field: and I do not find but that cattle eat that part, as close as any other. This grass appears to thrive in the garden; but should it grow when cultivated in the field with American luxuriance, I should doubt of an English sun being able to cure the hay to American perfection.

* Not having Kalm's Travels by me to refer to, I do not know the precise date.

† (1799.) In consequence of the above recommendation, the importation of oil-cake was allowed by 36 G. III. chap. cxiii. entitled, "An Act for allowing the importation of arrow root, from the British plantations, and also of linseed cakes and rape cakes, from any foreign country, British built ships, owned, navigated, and registered according to law, without payment of duty." But this act has had no effect as far as relates to the importation of linseed cakes and rape cakes from America; probably from a mistake in the wording of the act, which confines the importation to British ships alone. To import arrow root, the produce of the British plantations, it is requisite, according to the navigation laws, that it should be imported in British built

duum of rape seed, after the oil has been expressed; but as rape is a plant unknown in any part of America, though without doubt it might be cultivated there to great advantage, no oil-cake for manure can be procured from thence.

Much linseed oil is used in the United States, where the houses, mostly built of wood, are painted on the outside.

A great quantity therefore of what is called linseed cake, or oil-cake, being the remainder of the linseed after the oil is pressed out, might be purchased there; and would be highly useful in England, in fattening of cattle, and for other purposes: it is chiefly consumed there by milk-cows, in the neighborhood of the great towns, and sometimes in fattening cattle and hogs. The present price of it in America is 40s. per ton; while the price of the cake here is not less at this time than £8 8s.

A gentleman in this country, aware of the advantage of importing this article from America, was lately desirous of accomplishing it; but on making the necessary enquiries, found that those cakes came under the description of one of the *non enumerated articles*, and consequently were liable to a duty, (I believe £27 10s. per cent. on their value,) which amounted to an absolute prohibition. This prohibition seems in good policy proper to be taken off; and I cannot do less than recommend the subject to the consideration of the board.

"Irrigation is much practised; the method, soils, effect, and every other circumstance, should be attended to."

Irrigation, as far as I could learn, is known only in two parts of the United States, and in neither of them practised to any considerable extent. It offers no material circumstances worthy of imitation, nor is it conducted on any principles, that are not at this time much better understood in this country. Connecticut is the most northern state where it is met with: the practice was probably carried thither by the first settlers, most of whom emigrated from those counties in the west of England, where it is now best understood; but they do not appear to have kept pace in improvement with their kindred on this side of the Atlantic.

The German tract in Pennsylvania, is the other part where it is practised, and the knowledge was carried thither from Flanders or Germany. Two crops of hay are always cut where lands are thus artificially watered.

The law has ordained the right of the water to be in him who possesses the spring head, or the highest part of the stream; he may consume what quantity he pleases, but must convey the remainder into the ancient channel; he must not divert the stream, or waste the water to the prejudice of those below him. The mode of applying the water is different in the two states: in Connecticut it is turned on the land as soon as the weather begins to be warm in the spring; but it is not allowed to flow for more than twenty-four hours at a time: it is then taken off for a few days, then turned on again for twenty-four hours, and so on, till the meadow is nearly fit for cutting; immediately after which, it is applied again in like manner for a second crop, and then again to force the aftergrass in autumn but it is always found to have the greatest effect upon the spring crop.

In this state they also apply water to their lands, in another very different and unusual manner; they flood great tracts of low meadows, situated on running waters, just before the winter sets in, to the depth of two or three feet, by stopping the course of the stream, and let them thus remain covered till the spring, in order to keep them warm, and defend them from the frosts. These lands produce the following year a considerable quantity of coarse hay; which, in consequence of the fine climate in summer being very well got, is eagerly consumed by the cattle in winter; after the hay is cut, these fields for the remainder of the year are pastured.

In Pennsylvania the water is usually turned on the meadows about the middle of April, and is allowed to flow about two months; a few days after which, the ground having got dry, the crop is cut: as soon as the crop is off, the water is again turned on for three or four weeks, or till the land gets a sufficient covering to defend itself from the sun, at that season very powerful; a second crop is then soon ready for the scythe; after which the water is allowed again to flow over it, till within a short time before it is wanted for pasturage, when it is turned off, in order that the ground may so harden as not to receive injury from the treading of cattle. Which of the two methods of applying the water may be most productive, I know not, not having seen the meadows of Connecticut in the summer season; but those of Pennsylvania bear abundant crops.

Water issuing from limestone in Pennsylvania, is thought preferable to any other running stream; but the warm half putrid water from the reservoir made for this purpose, which is not unfrequent, or a mill dam, in which it becomes soft, slimy, and muddy, is greatly preferred to all others; water of this kind, at this season of the year, will in Pennsylvania be heated as high as 85° by Farenheit's thermometer, and must have a great effect in forcing vegetation

No art is used in conveying the water beyond a channel, carried on a level as far as it can be done conveniently, over one side of which it can flow: no means have been taken for raising it above its natural level, which in many places might be performed with much facility.

Since the introduction of clover, these meadows are falling fast into disuse, many of them having been already ploughed up and converted into tillage; no farther improvements are therefore hereafter to be looked for in this branch of rural economy.

"To examine how far, to what cause owing, and the effects of an indigent poor in the United States, is an object of great political importance, and whether such are ready to emigrate to, or beyond the mountains?"

There are no indigent poor in the United States. In a country, where in every part the demand for labor greatly exceeds the supply, where wages are high, and provisions not in proportion to them, no

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ships; but the oil-cakes, being the produce of foreign countries, ought agreeable to the same navigation laws, to be allowed to be imported in the vessels of the country that produces them, as well as in British vessels; as all other importable articles, the produce of such countries, are allowed to be imported: no doubt the words, British built ships, where they refer to linseed cakes, and rape cakes, have been inadvertently inserted. I must therefore again recommend this article to the consideration of the board, as the importation of linseed and rape cakes, appears an object well worth their consideration.

one can want, that will labor; and the able, who refuse to work, will there meet with no support. In the country, I never heard of poor; in the great towns, there is a reception for such as want it; in which are a few people, chiefly negroes and foreigners, whom the accidents to which the lower classes are liable in a town, or the diseases of a new climate, compel here to seek a refuge. These poorhouses are either maintained by a tax on the inhabitants, or more generally by the corporation of the town, or by the state.

None emigrate to the frontiers beyond the mountains, except culprits, or savage back-wood's men, chiefly of Irish descent. This line of frontier-men, a race possessing all the vices of civilized and savage life, without the virtues of either; affording the singular spectacle of a race, seeking, and voluntarily sinking into barbarism, out of a state of civilized life; the outcasts of the world, and the disgrace of it; are to be met with, on the western frontiers from Pennsylvania, inclusive to the farthest south.

GREAT DEPTH OF THE BED OF MARL LYING UNDER NORFOLK.

Having recently learned in a conversation with an intelligent gentleman of Norfolk, Va. that the boring for water in that town had passed through a bed of marl for more than 70 feet, without reaching its bottom, we were anxious to ascertain the strength of the body: and requested to be furnished with specimens (which had been preserved) from the upper, middle, and lowest part. These have been received, enclosed in the following letter, which, though private, we will make free to publish, as it states what is desirable to know, both clearly and concisely. The three specimens were so small that no larger trials could be made than are stated below—and nothing was sought but the carbonate of lime, which is contained in very small and yet very regular proportions, for such great difference of depths. The earth when mixed with diluted muriatic acid, is of an unusually vivid green color—and probably contains more *green sand*, than of carbonate of lime. This however is merely loose supposition. The depth at which this great bed of marl lies, and its small amount of calcareous matter, render the facts of less importance to agricultural, than they may be to geological investigators.

The carbonate of lime found was as follows.

At 70 feet deep—20 grs. contained	2 of carb. of lime.	
102	34	$3\frac{1}{2}$
140	27	3

Or proportions varying between 10 and 11 per cent.

Norfolk, July 18*th*, 1835.

Dear Sir—It affords me much pleasure to be able to comply with my promise, as regards the marl found in boring for water in this place.

I have seen one of the gentlemen who conducted the operation, and have obtained from him some information as to the different strata through which the auger passed, which I submit.

"For 14 feet below the surface, fine sand.
— 16 feet more, marsh mud and shells, chiefly clam and oyster.
— 10 feet more, unable to judge—the pipe being filled by upper mud.
12 feet more, fine quick sand, unmixed.
12 to 16 feet more, a different stratum of gravel, in size from less than an eighth, to three-quarters of an inch, the longest diameter—varying in color, but chiefly clear white, much resembling crystal.

Thence to the depth when the auger broke, say 70 or 80 feet, green marl."

This information is not given from notes, and is not exact as to distances, making the depth 138 to 148—the true depth reached being 143 feet.

I have received 12 samples of the following depths: 43 feet—47—49—57—62. These five are all of sand and shells, or pure sand. The others are 70 feet—82—92—102—108—128—140. These are all of marl, of nearly the same uniform appearance as to color, and of the consistence of putty. The only perceptible difference was that the upper part of the bed seemed to have more undecomposed shell in it, although shells were found at every depth.

I enclose small quantities of the marl at 70—102—and 140 feet. Should you wish others I can supply you with them at any time.

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THE THREE-SHIFT SYSTEM.—ON SPAYING HEIFERS.

To the Editor of the Farmers' Register.

White Marsh, Gloucester, July 10, 1835.

If I had leisure and the ability to convey my thoughts clearly and forcibly, I should certainly make some remarks for publication (and you are at liberty to use these if you think proper, and will take the trouble to correct and improve, holding me responsible for the facts*—) upon Mr. John A. Selden's communication in the first No. of the third volume of the Register; because it is calculated, I think, from the high standing and character of the author, as a gentleman and agriculturist, to mislead most farmers of the salt water region. His system may answer very well at Westover, and upon the fine wheat and clover lands on James River, after leaving the salt water, but as far as my observation extends, I do not think it will answer below. I have uniformly observed that the most successful farmers with us, those who live best, and accumulate most, (and I go for results altogether,) have been large Indian corn makers. That is a very certain crop on tide-water, whereas wheat is a very uncertain, at any rate a very unproductive one. On the White Marsh estate, producing from seventeen to eighteen hundred barrels of corn annually, it has not varied five per cent. for the last four years. There has been some improvement in the cultivation, which has enabled me to reserve a part of the former corn land for fallow and improvement, during summer, and still make about the same quantity of corn, as communicated to you in the early part of your useful publication.

I suppose Mr. Selden has stated the average corn crop made, and not what was sold, (I entertain the opinion of an old friend who considered

*We take this liberty whenever it is deemed necessary, as to matters of mere form. In this case it is in no respect called for. Ed.

the bill of lading as the best evidence of what was *made*,) by which it appears, the corn made on his estate would produce little more than one-third of the wheat made, whereas my corn crop would sell for about double the wheat and barley, (taking his price for corn and wheat, and the real price at which the barley was sold.) This year the disproportion would be much greater in favor of the corn, which clearly shows the difference in our situations, and the propriety of yielding to circumstances.

Mr. Selden informs us that he keeps twelve mules, and makes an average crop of four hundred and thirty-five barrels of corn. My regular plough team consists of six mules and six horses: two extra horses are kept, and another plough used at busy seasons. The average crop for the last four years, as before stated, is from seventeen to eighteen hundred barrels of corn. Mr. Selden complains that none of the advocates of the three-shift system will descend to particulars, and I consider myself decidedly one of them with a little variation, in having standing pastures and reserving a part of each shift in succession for fallow and improvement during summer. My three divisions consist each of about three hundred acres of low grounds, and a high land lot of about twenty-five acres, of which a part is for fallow, and that being in the corn fields is not grazed at all. From two hundred and seventy-five to eighty acres being in corn, the average product of course is a little above six barrels per acre. One of Mr. Selden's objections to the corn crop, "that it will not answer as a sale crop for persons living at a distance from navigation," is a strong recommendation to us upon the sea board. My small grain crop (that is, wheat and barley,) has averaged for the last four years about three thousand five hundred bushels per annum. The latter crop has been very unproductive for some years past, and on that account has been generally abandoned. About two hundred acres of corn land, and about sixty-five acres of fallow, are seeded in barley and wheat, the average of course about thirteen bushels per acre. I seed sixty to seventy acres of the corn land in oats, but not for sale, or very few. They are fed in a chopped state throughout the year, to every thing of the horse kind, mixed with a little meal. I have no doubt that much of the level tide-water country should be cultivated in two shifts, one year in corn, and the next in oats. A very improving bean under that system succeeds the oats, which is not the case under any other.

The most objectionable part of Mr. Selden's communication, in my estimation, is the reflection cast upon that valuable animal the ox, without whose services I would abandon agricultural pursuits. I am as devotedly attached to that species as we generally are in Virginia to that of the horse. The labor performed by oxen, when well taken care of, is incalculable; and the patience with which it is borne, always excites much feeling with me in their behalf. Nothing is consumed by them that can readily be sold from the estate. I would not permit half the quantity of corn necessary to keep them in good order to be given to mine, if it was furnished gratis; and never feed with it. A small quantity only serves to destroy their relish for coarse strong food. I would as soon think of feeding laborers on mince pies, and expect them to be satisfied afterwards with pork and bacon.

For Mr. Selden's favorite fallow system, the ox is admirably calculated. Four good oxen with one of Davis's large bar-share ploughs will execute more, and better work than any team of mules I have ever seen. When broken to, and kept exclusively for the plough, they walk nearly as fast as mules, and by working half the day and changing, lose no time to feed, and will keep in good order on the very land they are fallowing: for it either has, or ought to have, to justify the fallow, a good cover upon it. I am not a very nice calculator upon this or any other subject, but when we consider the first cost of a good mule, or work horse, the annual expense to keep him properly, the difference in gear, the interest upon the cost, and that the capital itself is lost upon an average in ten or twelve years, and then contrast him with the ox, we must decide in favor of the latter.

The mule is recommended by Mr. Selden on account of his longevity: but the ox may be said to live forever. If taken care of, an old ox will more than purchase a young one. I keep employed the greater part of the year, upon an average, thirty oxen (including spayed heifers, which my people prefer to the ox, as more active, and of better wind, and they are greatly preferable for the table.) They cost me nothing, and return to the land at least as much as they take from it.

It is so important to separate the young from the old cattle (until they are three years old at least,) without which you cannot get the females at any rate of good size, that I keep three standing pastures, one extending to the river for the purpose of salting all the stock occasionally. Another consists of an extensive wood with a small portion of open land, and is useful in winter and spring, particularly for sheep, which are very injurious to pasture early in the spring. I never graze the cultivated land until late in June—(August would be much better—) when it is well covered, and the stock can make very little impression upon it.

I am sure the annual profit by sale, derived from my stock, in addition to the supply of my family, would more than pay every expense of the estate, and almost entirely from Mr. Selden's despised race, (the sale of oxen, milch cows and butter,) for I give to my people in addition to a moderate quantity of beef and mutton, all the pork we can raise over and above the consumption of the family. I made the arrangement as an inducement to take care of and increase the quantity, and find it succeeds very well. The hams which we do not use, (more than half) are sold at a high price, and the proceeds invested in midlings, which are preferred. All the wool, with enough cotton both for the summer and winter clothing of the slaves, is manufactured on the estate, so that if we do not sell much, we purchase little.

JOHN TABB.

P. S. Since writing the above, the No. of the Register for July, has been sent me from Norfolk, in which I observe a communication on the subject of spayed cows. I have often thought it strange the practice of spaying was not more common. About sixteen years ago, my father, Philip Tabb of this county, who was in the habit of spaying two or three heifers every year for beef, at the proper age, had the experiment made on a cow with her first calf, which succeeded; and he sent her to me at Norfolk, after keeping her a year or two, thinking she would be desirable for a town cow. She gave as much milk as ordinary cows, and I thought at first she would be a great acquisition, but soon found one inconvenience attending her which had not occurred to me. Having no calf to attach and accustom her to my lot, it was necessary to send after her whenever required, or keep her up altogether, which was inconvenient, and being (as most spayed animals generally are) in fine order, I lost her in a few months, and have no doubt she was sold to the butcher. I have always regretted the loss, not so much on account of the value, but that I might have ascertained how long, and in what quantity she would have continued to give milk. I have now on this estate eighteen spayed heifers, (and I kill two or three every year for beef,) from one to seven years old. The operation is performed when they are about a year old, say in the month of May, and with the single precaution of keeping them entirely from food or water for twenty-four to thirty-six hours before—is not attended with the least risk—is performed in the same way, and may be done by any person in the habit of spaying hogs. They go to their food immediately after, and require no attention. The operation has been imperfectly performed two or three times, and they had calves afterwards: but I have only lost one, and that in consequence of keeping it suspended a very long time, in order to teach, and indeed, to permit an inexperienced hand to operate. We select the most indifferent calves to spay, which is one way to improve the stock. You increase the size amazingly. They become as large as ordinary oxen—are easily kept—make the finest beef—and as they are not in perfection till six or seven years old, we work them after three or four, to make them gentle, and consider them superior for that purpose, to the ox.

I have had so little experience in farming, and am necessarily so much absent in the performance of other duties, that I am loath to make any communication for publication, and certainly should not, but for my knowledge of the liberal and charitable feeling amongst farmers toward each other. One of the greatest objections to landed estates in Virginia, consists in the difficulty of procuring first rate managers. The difference between good and bad management is, abundance and wealth in the one case, and want and poverty in the other. I have been very fortunate in that respect; and acknowledge myself under obligations to Mr. Anthony Smith, my manager. For industry, humanity, care and attention to the people and stock, he cannot be surpassed; and I take the liberty to suggest to every farmer who has a good manager, the propriety of selecting one or two boys of intelligence and good character, to place under him. Patriotism and self-interest should prompt them to do so, as the best mode of increasing the number of good managers, and their chance of obtaining one, and of improving the country. It is impossible for the proprietor of a large estate to attend to the details; and perfectly useless for him to read, think, and plan, unless he can procure an agent who can understand and execute.

J. T.

July 13th, 1835.

For the Farmers' Register.

REMARKABLE FECUNDITY OF A EWE.

Mr. William Nottingham, sen. has at his farm near Eastville, (Northampton, Va.) a ewe which has brought 20 lambs in 7 years and 2 months, from the first to the last yeaning; and omitting the last, the first 19 lambs were produced in less than 6 years. The following dates and numbers were copied from the written memoranda kept by Mr. Nottingham, on whom, as a man of observation and accuracy, the most entire reliance may be placed.

The ewe was yeaned in February 1827.

In February 1828, she brought	2 lambs.
February 1829,	4
November 1st, 1829,	3
(being 7 in 19 months.)	
February 7th, 1831,	3
March 10th, 1832,	3
January 18th, 1833,	2
December 31st, 1833,	2
April 13th, 1835,	1

None of these were supposed to be premature births, and as large a proportion of the lambs lived as could have been expected in ordinary flocks, from births as they usually occur. Great care was generally taken of the mother, but owing to particular occurrences, she was sometimes greatly exposed. Her four lambs were yeaned at a birth, when out in a severe snow storm, and all (I believe) died in consequence. The ewe was raised as a house lamb, and is of the common breed. She was the only ewe kept on this farm, and has been always fed abundantly. When giving milk, her udder was stated to be more like a cow's in size, than that of a sheep. But if her fecundity was caused altogether by high feeding, it would seem that the same effects may be continued in her race by like treatment. Some of the female lambs of this ewe were given to Mr. Nottingham's sons, and have been kept as breeders, with the like abundant supply of food. Of these, "one has had 4 lambs at one time, and 3 at another time—another had 4 lambs at her first and only yeaning—and a third has had 3 lambs at one yeaning." These latter facts were also furnished me in writing by Mr. Nottingham's son. I omitted asking what proportion of these were raised—and did not note down the proportion of those lost by the old ewe.

Mr. Nottingham's flock of sheep is kept on grazing land on the sea side, and the mother of this family has been the only ewe kept at his house. In addition to this peculiar situation, she had the company every year except the last, of more than one male—as several ram lambs were brought home from the sea-side pasture at shearing time, to be killed in the course of the year. Upon these facts, and his observations, Mr. N. has formed the opinion that the several lambs of each yeaning, had different sires—and that the number of males in fact determined the number of lambs. Whether this strange opinion is well founded or not, Mr. N. is so sure of it, that he has latterly more than once before the yeaning stated correctly the number of lambs that would be produced. The last time there was only one male with her.

E. R.

"A DEED WITHOUT A NAME."

To the Editor of the Farmers' Register.

Having derived much useful information from your valuable periodical, the Farmers' Register, I have thought it the duty of the whole fraternity of agriculturists to contribute each his portion of information for the benefit of the rest. Indeed, my mite would have been thrown into the general coffer before this, but for my thorough aversion to placing my proper name to any paper which possibly might get me into difficulty, or which might involve any sort of responsibility. Shall I tell you the reason? A *friend* of mine gave me a mortal aversion to its vain glorious use. Some sixteen years ago I visited Richmond, and was invited by a gentleman of that city to partake of his good cheer, and being somewhat fond of the good things of this life, I indulged as far as a reasonable man may be supposed to have done. At the winding up of the feast, my friend invited me to unite with him in a note for $10,000 at one of the banks, which he would at a proper time redeem. The request was reasonable enough—the name a mere matter of form. Besides, it was quite a creditable thing to be the endorser—aye the endorser, of such a good fellow, and one who spoke of thousands as I now do of dollars. Well! sixteen years have passed away—my friend is a bankrupt—his property made over to a favored few: and if you have any curiosity to know who the author of this paper is, on the first discount day in August, a small man, of a sorrowful countenance, wearing a broad brimmed straw hat, and riding a gray mare, may be seen on the turnpike, wending his solitary way to Richmond to renew this very note. True, it has been clipped a little, but the sum of $6450 still remains due. Can mortal man wonder at my aversion, therefore, to write my name in full on any paper? Such is my abhorrence, Mr. Editor, to any unnecessary display of the sort, that in addressing my own dear children I subscribe myself generally, simply "your father." I know them to be wise, and rely on their knowledge of the old man.

With these preliminary remarks, I shall proceed to give in my experience as a tiller of the earth. *I have marled*, Mr. Editor, God be praised, I have marled. Not to the extent of thousands, but a cool hundred or two. Now mark me. In one of my best fields, I had a gall, a washed knoll, precisely such a spot as every judicious farmer most sedulously avoids when showing his crop to his neighbors. Now, sir, one of my first operations with the precious mineral, was to apply it to this knoll, or gall. And what suppose you is the consequence? Why, sir, when a neighbor comes to see me, and a walk is proposed, I generally manage to take him by a sort of circumbendibus, around to this poor despised gall, where on this 13th of July, the corn is actually tasseling, and probably will produce six or eight barrels per acre. I could not have believed it on the testimony of others.* Mortal man would scarcely believe it. And now my good sir, when my spirits are depressed, I generally take a walk to look at the corn on the marled land. When the cashier informs me that on such a day my note falls due, I walk to the marled land. If any thing crosses me there I go, morning, noon, or night. Upon my word I begin to think marl will cure half the ills of life. My wife says it has prevented the chickens having the gapes. She declares that never had she so little trouble with the young turkeys: and in fact she verily believes the health of the children is greatly improved. All this, my dear sir, she attributes to the marl. And now, sir, I am straining every nerve to fertilize every arable acre of my farm, by its immediate application. An ox cart is generally devoted to this business: and I regret that my means will not enable me apply double the force to this beneficial purpose.

I entreat you not to regard this as an exaggerated statement. I am incapable of an untruth, or any manner of deception.

SUBSCRIBER.

*_Neither can we_—and it is presumed that our correspondent will permit others in this respect to assume what is precisely his own ground. Farther—*we would not believe our own eyes* in such a case—and if more respect could be paid to the eyes of another, it would not be to a correspondent without a name.

For the Farmers' Register.

ANALYSES OF SOILS [FROM ALABAMA] MADE BY DR. R. W. GIBBES. JULY, 1835.

Colberton Plantation of Col. F. Elmore.

1. *Black or Slue Prairie*—(from Big Slue—) 6 to 8 inches below the surface.
Vegetable matter 26 per cent.
Carbonate of lime 32 "
Silex, alumina, oxide of iron [the remainder.]

2. *Hammock Prairie*—(between House and Cedar Ridge.)
Vegetable matter 36 per cent.
Carbonate of lime 22 "
Silex, &c. &c.

3. *Open Prairie*—mahogany colored—(between Gin House and William Colbert's field.)
Vegetable matter 38 per cent.
No limestone.
Silex, &c. &c.

4. *Hog Bed Prairie*—(William Colbert's land.)
Vegetable matter 26 per cent.
Carbonate of lime 8 "
Silex, &c. &c.

Of course our amount of faith as to such effects of pure marl alone, is (like our correspondent's interest in the bank,) a quantity largely *minus*.

But though holding as nought the only agricultural fact of our unknown correspondent—and supposing that his object is to make light of those whom he may deem marl-mad farmers—his communication is freely given a place; and if for no other reason, as evidence that we are willing to bear our full share of good humored reproof, whether deserved or not. In this it is hoped that a profitable example is offered to some of our "thin-skinned" friends. Whenever our new correspondent will give his true name, or authenticated facts, he will be received with hearty welcome—(and the more so if his hand writing should be more legible—) for however well he handles his present subject, it is not altogether suited to this journal, and would not have been admitted, but for its apparent personal bearing.—ED. FARM. REG.

5. *Post Oak Prairie*—(near Goodson's.)
Vegetable matter 38 per cent.
No limestone.
Silex, &c.

6. *Moulton Plantation of Dr. J. H. Taylor. Black Slue Prairie*—(Woodland's—best.)
Vegetable matter 28 per cent.
Carbonate of lime 12 "
Silex, &c.

7. *Prairie*—(scattering last post oak) mingled with red clay.
Vegetable matter 32 per cent.
Carbonate of lime 6 "
Silex, &c.

8. *Open Prairie*—from a hill or ridge.
Vegetable matter 32 per cent.
Carbonate of lime 18 "
Silex, &c.

Chisholms.

White Open Prairie—from near surface: soil not more than 18 inches.
Vegetable matter 28 per cent.
Carbonate of lime 42 "
Silex, &c.

All the specimens except the last, taken from about 6 or 8 inches below the surface.

SOME ACCOUNT OF THE PRAIRIE SOILS OF ARKANSA.

To the Editor of the Farmers' Register.

Hempstead Ark. Ter.
June 27, 1835.

The May No. of your valueble journal being received, my attention was attracted by "Statements of the constituent parts of soils of the prairies of Alabama," and more particularly fixed by the editorial remarks soliciting information on the subject of prairies in general.

In anticipation of Mr. Featherstonhaugh's forthcoming report of his geological survey of Arkansa, (though I much fear from the rapid manner of his travelling among us, his investigations have been neither accurate nor minute,) I will endeavor to give you such an account of those in my vicinity as a sixteen years' residence among them, without any pretensions to science, enables me to do.

The prairies of Arkansa exhibit every variety of soil, surface, exposure, and degree of productiveness, when under the hand of culture. Those that border the Red River are nearly a perfect level, formed of alluvion, composed of a dark red clay and sand, a little elevated above the surrounding timbered land. They contain no remains of shells, but the soil resembles in all respects, that of the timbered alluvion adjoining.

Another description of prairies occupies elevated situations, the surface composed of a mixture of rounded smooth pebbles, oyster shells and their fragments, a pale yellow clay, and a little sand. They are broken into ridges and valleys, and rounded knobs surmounted with post oak timber.

The Mound Prairie, and those that extend for some miles around it, are found of gently swelling ridges, divided by timbered valleys. They exhibit considerable variety of soil. On some the surface is mixed with sand; others are nearly or quite destitute of it: some are a deep black; others a light gray; others again are of a yellowish brown; and the whole of them rest on a foundation at various depths from the surface, from one to six feet, of a pale blue rock, that is soft enough to cut with a knife, but hard enough for hearth stones if kept out of the weather, but which slacks and crumbles into powder on exposure. I have seen corn and cotton of the rankest growth, standing in an unmixed bed of this substance that had been thrown up from the bottom of a deep well. This rock lies in strata of from four to eight inches thick, in alternate layers of harder and softer matter, and of a darker and lighter color. The lighter colored masses have been burned into a superior quality of lime, and the deeper into good potter's ware. Oyster shells and pieces of coral are every where found upon the surface, and imbedded in the rock; as well as petrified bones, and a very heavy black substance that resembles blacksmith's cinder, and entirely volatilizes by heat, with a strong sulphureous smell.* This sulphur ore, as it is called, when exposed to the air under shelter, incrusts itself with crystals of copperas. Masses of crystalized gypsum are also sometimes found deposited in chasms of the rock penetrated in digging wells. This rock, varying but little in appearance, underlays the whole of this section of country, timbered land as well as prairie. Large trees torn up by storms, many times contain, entangled among their roots, oyster shells and their fragments, rounded smooth pebbles, red clay and sand. When the timbered lands join upon the prairie, the roots of the timber are imbedded in a stiff red clay, and elevated generally about a foot above the edge of the naked prairie, exhibiting the appearance of this superstratum having been washed away from the space occupied by the prairie. The roots of the timber however, strike some depth below the red clay, into the shelly substance beneath.

These prairies when I first saw them in 1819, were clothed with a tall fine grass, and ornamented with flowers, without any mixture of timber or shrubbery, except at long intervals, where a clump of veteran post oaks had been able to resist the annual fires. Now, a large proportion of the prairie is in cultivation; and what is left out as commons is nearly divested of its native grass, by numerous herds of domestic animals. The fire has ceased to sweep over them, and thickets of crab, thorn, persimmon, mulberry, elm, honey-locust, peccan, the different oaks, the vine rose, grape vines, rattan, green brier, and blackberry bushes, render them in most places impassable. In the oldest thickets, the more vigorous trees are already destroying those of weaker growth, which die, fall, and the fire thus furnished with nutriment, begins to thin out the underbrush, and give this recent growth the appearance of young open woods. Thus, as soon as the native grass is so much eaten out as to prevent the fire from running over the prairie, these sprouts spring up—pierce with their roots the shelly substance beneath, loosen and dissolve its texture, elevate its

*This is sulphuret of iron—also found in the Alabama prairie soils. See Essay on Cal. Man., 2d ed. p. 22.

surface, change its color, and form and accumulate a rich vegetable mould. The new lands lately cleared of these thickets, and put into cultivation, are much richer and more productive than the naked prairies formerly were, that were put in cultivation before the thickets had grown; and the prairie fields that have been many years in uninterrupted cultivation, in corn, cotton, wheat and oats, and so managed, by ploughing in all the vegetable rubbish every year, as to prevent the soil from washing, are continually improving. I know of one field of fifty acres that was at first a naked gray prairie, that has been constantly cultivated in cotton for the last ten years, that produced last year a bale of cotton to the acre. The rust in cotton has never been seen in the country. The soil of this field has become black. The black timbered land of the valleys, however, the soil of which is composed of the wash from the prairie hills, mixed with the decayed vegetation of the low grounds, is that which is the most valuable. The oldest fields show no symptom of decay, nor are they much influenced by excessive rain or drought. They have been proved to be equal to any soil in the world, in any climate, for corn, cotton and wheat. The vast extent of new wild land that remains yet to be put into cultivation, has as yet prevented us from paying any attention to improving the quality of our soils, for indeed, they are so rich by nature as to seem not to require it. The crops of last year were fully equal to any ever before produced; and those on the oldest fields were the best. For this reason, the crops of wheat, though few, and on a small scale, might vie with those of the middle states in the best seasons. We have now, at this time, had no rain to moisten even the surface of the ground since the 30th of April last, yet our corn and cotton on the low grounds are not in the least injured.

Thus have I given you a statement of facts respecting the southern portion of Arkansa, as they have come within my personal knowledge. I regret much my inability to give you a chemical analysis of the different soils, and still more the want of a proper conveyance for specimens. I want to send you, or the editor of the Farmer and Gardener, larger quantities than are proper for the mail, and I would with pleasure remit a box during next season, to any gentleman in New Orleans, whom you will name to me for the purpose.

From the sensible properties of our best prairie soil, without using chemical tests, I judge it to contain a large proportion of carbonate and sulphate of lime; a due proportion of alumine, and a small proportion of silex and iron. A strong smell of sulphur is also sometimes perceived from fresh ploughed ground in a hot day, and lumps of carbonate of magnesia I have found imbedded in a red clay.

Intelligent strangers that come among us, gaze at every thing they see with wonder and delight. They find many things new and unheard of, in the appearance and sensible properties of the soil, the vegetable productions, and the indications of minerals. They are captivated with the transparency of our atmosphere, and the rosy glow of smiling health that animates the countenances of the inhabitants.

N. D. SMITH.

ON THE ADVANTAGES TO BE DERIVED FROM THE ESTABLISHMENT OF AN AGRICULTURAL PROFESSORSHIP.

To the Editor of the Farmers' Register.

Barboursville, July 23, 1835.

SIR:

It has been a settled conviction on my mind for years, that a professorship of agriculture—a pattern farm, and such a paper as yours, united therewith, would be productive of incalculable benefit to the commonwealth. The space of a letter is too confined to admit of one-half being stated. Suffice it to say, it would elevate the science—add dignity to the pursuit—call off from encumbered vocations a portion of the mind of our citizens now lost to the community—present a rallying point for all the scattered information of the land—reduce to the test of experiment every theory plausible enough to justify it—by the same standard to prove the value of every discovery or improvement—promote economy by causing one experiment for many—a certain and rapid communication, through the state, of the results—furnish a sure means of ascertaining the nature of our climate—the quantity of rain falling in the year—the seasons when drought most generally prevails—and by consequence, furnish data to guide the husbandman in the cultivation of crops, both as to time and kind. But I must stop—for I find no end to the advantages that would result from such an establishment. Let me, however, add one more. All these things are to be done before the youth of Virginia—the future men of the commonwealth, destined eventually to influence her destiny. A portion of these, selected from every part of the state (say one to each congressional or senatorial district,) of promise, but unable, from poverty, to educate themselves, to become the adopted children of the state, would be able by alternate labor and study, alike to keep up the farm, and to improve themselves. Indeed, it is worthy of the profoundest consideration, whether every student of the University would not profit by a few hours' work daily, in the proper season. These being my views, I submit to you whether it does not behoove the tillers of the earth to make an effort to induce the legislature to attend to their neglected interests. How is this to be done? I answer, as every other sect effects every thing by conventions—to that alternative we must also resort. What say you to such a convention, to meet in Richmond the first Monday in January? Let any one who feels an interest in the object attend. Let each agricultural society in the state be represented there. If it be asked what good can come of it, the answer is, let us try it. A free communion of the intelligence of the land cannot be altogether unproductive of good fruit. Apart from what can be done by such a convention on its own means, an appeal may be made to the legislature under the weighty sanctions of their united wishes, to do something for us. If the view which I suggest is esteemed impracticable, they may incorporate an agricultural society in each congressional district, and award a small sum to each, to be distributed in premiums, after the manner of New York and other states.

But it is objected that it will cost something. Have we not as a class offered our fleece annually, without a murmur, to be appropriated to other improvements? Is it unreasonable that in turn we should require a small portion of our own to be applied to our peculiar benefit? A small portion of the interest paid annually by the University, would in a few years put our scheme completely in operation, and I verily believe after that it would be able to support itself. However, all these things might be discussed in convention, and digested in a form that would be most acceptable. And I may be permitted to add, that for once we should have a convention whose sole object would be the good of the country—a spectacle so singular in these times, that it could not fail to be as consolatory as the oasis to the weary traveller of the desert.

If you agree with me on this point, you can greatly promote the object by inviting the meeting in your journal. If I thought my name would be of any service, you would be at liberty to use it with my remarks. But I fear not. However do as you please. I have it much at heart to do something. Better heads than mine may suggest better plans, to which I will most cordially submit.

Accept assurances of my high consideration,

JAMES BARBOUR.

We concur entirely with the foregoing views and recommendations, and shall be pleased to aid them, as has before been attempted, through this journal. We are also clearly of the opinion that nothing in aid of agricultural interests, or agricultural science, is to be expected from our legislature, unless prompted and urged by the expressed wishes of their constituents: and therefore the more ready admission of the necessity, and probable advantages, of consultation among the zealous and intelligent friends of agriculture—either in the mode proposed above, or in some other. There is no individual whose voice is entitled to be heard with more respect on this matter, than our correspondent; but it is desirable that others should also present their views, both as to the objects to be sought, and the mode of seeking them. Though willing to support, and lend our efforts to further any other plan of combining our force that may be found more pleasing to the greater number of the agricultural community, we see no reason now to object to the particular plan proposed above, viz: a meeting and free conference of all the members of the agricultural interest in Virginia, who may have enough zeal to join in the effort, for the purpose of determining on what aid of government agriculture most needs, and of asking it respectfully of the legislature. In the mean time the expression of different views on this subject, and discussing the comparative merits of the different ultimate objects in view, will greatly facilitate the operations of such an *agricultural conference*—and we invite to our pages, the expression of opinion of any of those who feel interest in this important subject.

It is hoped that the several societies will take the proposal into consideration, and give it their support. In whatever manner the meeting may be constituted, there can be no sound objection to the qualifications of any individual as a member. The agricultural interest in Virginia, however overlooked and neglected by the government, is still the *national interest*—and nothing can be derived for its benefit, by the whole or by any portion of those belonging to it, which would not be as beneficial to the commonwealth, as to agriculture. Such a meeting could not do otherwise than honestly labor for the good of the country—because that would be most effectually done by supporting their own. All bodies of men may be trusted implicitly when their private interest is to be promoted by the same measure, that will support that of their country—and none ought to be trusted when these interests are separate and opposed.

A STRANGE FISH.

A sea monster has been caught somewhere in the neighborhood of Norfolk, which is thus described by the Norfolk Beacon:

"Its general outline is that of a turtle, the fins or flappers being much longer. The whole fish is covered with a shining black cuticle or outer skin, (easily removed,) with the exception of the top of the head and the spinous processes of the back, which are white, with irregular outlines, as if it had been rubbed in three places. Immediately under the skin is a bony covering, extending over the back and down the sides, ridged with seven or nine bony prominences or spines, running nearly parallel with the back bone. The head is that of a turtle, with the upper lip or bill notched, so as to form two prominent pointed teeth or tusks. The throat and inner part of the mouth is fretted with spikes about two lines thick at the base, an inch long, of a horny substance, hanging loosely, but looking towards the throat, so as to permit a ready entrance, and completely preventing regurgitation, or egress. It measured eight feet in length, and nine feet from tip to tip across the fins."

From the Hartford Patriot.

ERIE CANAL.

In consequence of the great increase of business upon the Erie Canal, the Legislature of New York, at their last session, passed an act directing the Canal Commissioners to commence the construction of a double set of lift locks, as soon as in the opinion of the Canal Board the public interest should require it, and the enlargement of the Canal itself, the dimensions of the canal and locks to be determined by the Board. On the 30th ult. the Canal Board convened at the Comptroller's office, in the city of Albany, and adopted several resolutions, among which is a resolution that the public interest *does require* the construction of a double set of lift locks and the enlargement of the Canal. It was resolved to commence the construction of the locks immediately, and the enlargement of the Canal as soon as a sufficient sum shall have been collected from the canal revenue, to discharge the Erie and Champlain Canal debt—that the width of the Canal shall be in general sixty feet on the surface of the water, giving a depth of water of six feet. Several other resolutions were adopted for the purpose of facilitating the work. The Board adjourned to hear the report of the Engineers until the 20th of October next. The time required for the completion of the locks from Albany to Syracuse is estimated at three years—and six years to complete the Canal. The enlargement it is supposed will be commenced in about one year. By this arrangement the width of the Canal will be increased twenty feet and its depth two feet. It is believed the expense of this great work will be paid out of the canal revenues by the year, 1845, which is the time fixed for the redemption of the original canal debt.

WHEAT AND CHEAT GROWING FROM THE SAME ROOT.

To the Editor of the Farmers' Register.

Pampatike, King William, June 22, 1835.

As there seemed to be a great difference of opinion sometime since in the Farmers' Register among some of the farmers with regard to chess or cheat in wheat, I think the following ought to decide the matter. My manager found this morning a bunch containing three heads of cheat and two of wheat, growing from the same root. It has always been my opinion that cheat was degenerated wheat.

THOMAS CARTER.

White Sulphur Springs, July 21, 1835.

Dear Sir—Yours of the 28th ult. has just come to hand, and I am sorry the plant alluded to was not preserved, or it would afford me pleasure to send it to you. It was found by my manager, and not taken care of. He says he has seen the same thing before.

I am, yours respectfully,

THOMAS CARTER.

Being desirous of establishing truth, and not our own particular opinions, and considering with Mr. Carter that such a fact as this, fully established, would decide the controversy, we wrote immediately after receiving his first letter, to ask that the entire plant might be submitted to such scrutiny as would leave no suspicion of a mistake. This request was dictated by no doubt of the good faith either of Mr. C. or of the person who stated to him the circumstance—but by the remembrance of a mistake of our own making. Before having formed a decided opinion on this disputed matter, we once found a bunch of wheat, then just getting into head, and of which some heads were of cheat. The fact seemed conclusive: and if the bunch had been then thrown aside, after what was deemed close examination, we probably would have been always willing to swear to its truth, and of course to the fact of the transformation. But intending to preserve the bunch as a curiosity, and for permanent evidence, it was carried to the next brook to be well washed, so as to clear the roots of all the adhering dirt. In this operation, and without applying any force, or having any expectation of such a result, the roots separated, and showed two distinct bunches, so closely interlocked that they before had seemed to be one, and to have sprung from the same seed.

MANURE ON POOR SOILS. PUBLIC IMPROVEMENTS, AND POLITICAL JOBS.

To the Editor of the Farmer's Register.

Caroline county, Va. July 27, 1835.

Your remarks on my letter, (Farmers' Register, Vol. II. page 614,) have, I have learned, disheartened many farmers on poor land, and I assure you, sir, I saw nothing in them to cheer my spirits, or increase my ardor in attempts to improve lands naturally poor. The consumptive patient does not always despair after an unfavorable prognosis. "Hope ever lingers in the hectic breast." Your experience, it seems, as well as my own, goes to prove the difficulty, if not impracticability, of enriching lands naturally poor, (and exhausted too, by long cultivation) by vegetable matter alone. You have pursued the four, and I the three-shift system. You have fortunately found a remedy in *marl:* I have not. You seem now to pursue a course calculated to make amends for all your former errors and disappointments, as well as your toils and losses. In this situation, sir, I think you seem to abandon us to our fate, if not with disgust, at least with but little or no hope for our success. Without marl or lime, we are doomed to poverty or emigration: and to add to our sufferings, your "Commentator" laughs at our calamity. This is more than we can bear. *You* are elated with your discovery of the catholicon—*he* with a smile points you to the *opprobrium medicinæ.* Whatever may be the success of your panacea, we cannot but hope that the God of nature has provided other available remedies. Do not too hastily conclude that human genius and human effort must centre in lime. Do not believe that all lands naturally poor are doomed to their present condition without lime. Would you, sir, presume that you have fathomed the depths of nature, or spanned the circle of human ingenuity? Remember the story of the three clergymen and the setting sun in St. Piere's "*Studies of Nature.*" How do you know, sir, but your discoveries (and great I must call them) are but the platform: the mighty edifice is yet to be erected. Damp not then, I beg you, human effort; nor doom not to endless poverty the descendants of poor-land-farmers in our native state.*

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*We could not state our views more clearly than was done at the place referred to above (Vol. II. p. 614,)—and indeed, though condemning their having been so expressed, our correspondent seems to concur entirely in their general correctness. When declaring that the putrescent manures alone, furnished by a farm of soil naturally poor, could not enrich it—and that calcareous matter being added *would* serve to produce that effect, certainly and profitably—it was not thought necessary to state also (what we now readily admit) that there may be other substances or means, though as yet unknown, which may serve the same or even a better purpose than calcareous earth. We then knew of one means only, and therefore spoke of no other. We were aware that the views expressed were likely to be unpalatable to many—and certainly the expression was not calculated to aid the popularity, or add to the profits of this journal. Our correspondent

When I spoke in my letter of lands originally poor, I enclosed in a parenthesis "*I may say compared with much.*" Now if most of those lands were poor enough originally "to make a rat cry," I do not know it; whatever they may do now. I had heard of one or two generations preceding the present, with large families, some of them buried in the forests of the west, and some of them buried by the sepulchres of their progenitors. As poor then as these lands may have originally been, as poor as they now are, should they be abandoned, without more than a *single* effort being made to restore them to their pristine, or a much higher degree of fertility? Last of all, should *statesmen* and *politicians* ridicule them? Should the farmer himself? Should the agricultural chemist? Not yet having discovered a system, a remedy, ought not this very failure to excite the compassion of the statesman and the patriot? Although, sir, I consider myself but a poor politician, I had reflected a little upon the condition of the farming interest of our native state, the bone and sinew of the commonwealth. I thought I had discovered that under the present system (or rather want of system,) our state was, and had long been, on the decline. That great numbers of her most wealthy and intelligent farmers had moved to the rich lands of the west and south-west, carrying with them their wealth, and intelligence or knowledge, which is said to be power, and left only their depreciated lands—whereby the sources of taxation for the support of all state expenses were daily diminishing. In addition too, the learned professions must necessarily have a more scanty support: and I had for years seen the young lawyer, physician, and perhaps the more useful divine, wending the same way. When, in fine, I saw a rapid decline of our state, both physical and moral, I was constrained to ask the political questions, with suggestions, from which, "Commentator" with so muck kindness and confidence informs us that I "appear less at home." I hope "he will pardon me for saying," that after reading his commentary I am "of the same opinion still;" and I believe I am so, not because his views are "against my will." I feel no disposition, nor have I the information or ability to enter into discussion of this subject: yet I will say, that although I have not "consulted the most approved writers on the subject, nor statistical comparisons of the two methods of conducting internal improvements by private chartered companies, or entirely on state account," yet I should suppose after all that has been written by "the most approved writers," that there is opening for *two* opinions upon the subject, from the fact of some recent internal improvements (in other states) on the "state account" principle being in progress, or that "the most approved writers on this subject" must have very recently come to light.

As regards the trial of our sister state who has involved herself in a debt of some fifteen or twenty millions of dollars, I conceive the trial as yet by no means concluded. "Commentator" may suppose after the completion of these important works, the tolls will never be sufficient to pay the interest and necessary expenses, much less to extinguish the debt or loan. If so, the trial will be conclusive. Should the tolls not only pay the interest and expenses, and extinguish the debt, and ever after bring a handsome revenue into the state treasury, then I suppose "Commentator" would not object; even too, if many of those undertakings have been made poltical party jobs, with incompetent undertakers and superintendents, and the expenses much greater than those of any private company or companies. I say so for this reason, that where a *state* undertakes all these internal improvements, some of them might fall far short of expectation, and be unproductive, either after the strongest presumptive evidence that

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knows well that the physician who would always honestly tell his patients when he considered their diseases past the aid of his skill, or who refused to prescribe for what he knew to be incurable maladies or infirmities, would soon lose his practice. The rule applies as well to land doctors, as to body doctors. As there are plenty of the latter who will always give their patients *hope*, even when *help* is out of the question, so the great body of prescribers for the diseases of soils always promise relief, and a state of vigorous health, and to be gained easily, cheaply, and profitably. Such flattering promises are always more impressive than statements of opposite character—and if any readers desire to get rid of all despondency produced by our former croaking, let them read the first address to an agricultural society that comes to hand—and ten to one, but they will find the proper remedy, in the prospects exhibited, of certain, speedy, and cheap agricultural improvement, on the poorest and most intractable soils.

But for our part, we cannot hold out what are believed to be delusive hopes—and we consider that the only solid expectation for a cure must be founded on the full knowledge of the malignity and strength of the disease, and of the nature of the medicines proposed to be used. We do not say to the tiller of naturally poor soil that there is no hope for fertilization or profit—but that he will fail in reaching both, if reliance is placed solely on not grazing, and otherwise applying putrescent manures.

But even if any region is so situated, that making the soil generally fertile cannot be reasonably expected, there are particular kinds of products which might be there obtained, and yield as much profit as an equal amount of capital vested in richer land elsewhere. Much of the land of New England furnishes examples of this truth. The soil is so destitute of lime, that it is not only naturally poor, but is incapable of producing wheat to any profit. Yet these lands yield great profits, and command high prices. Two of the most profitable parts of agricultural business pursued there, are silk culture and sheep raising—and both of these are much more opposed there, than here, by the long and severe winters. These are only named as examples. In Virginia, we scarcely ever think of a change of crops, products, or habits, no matter how much required by difference of soil. We almost every where aim to raise corn, wheat, oats, tobacco, or cotton, for market—and seem to have no choice except among those very few of all the numerous and varied productions of the earth, and of agricultural industry.

they would be profitable, or from incompetent undertakers and superintendents, and exceeding great expense: yet when the whole be completed, if the result be an income not only sufficient to pay off the debt and expenses, but to relieve the citizens of the commonwealth from direct taxation, what more could be wished.

The last important objection with "Commentator" is, that "almost all matters of internal improvement when undertaken on public account, are forced to subserve, in locality, in the choice of agents to conduct them, and in the expenditures lavished on them, the popularity of the occupants for the time being of political power." This I presume would be true in a greater or less degree. This, however, is one of the evils attendant upon fallen man. It may be traced to the principle of self-love, which prevents men from doing unto others, as they would that others should do unto them. As these favors depend upon the *occupants* for the time being, and the occupants depend upon *popularity*, and popularity (I am truly sorry to say it) upon the *wind*,* and the wind blows from different points in a short time, so it may not be long before these favors are pretty equally divided. At any rate I see no good reason why through fear of partizan favors, varying with the popular breeze, we should have all the control, profits and emoluments (which may be great) permanently fixed upon a few individuals and their heirs, instead of the profits being thrown into the public treasury for the common weal. When I penned the questions above alluded to "on certain topics of political economy," I had not the smallest expectation of ever hearing of them again. Yet as they have been thought so erroneous by "Commentator" as to excite his attention, and as I verily believe with a view of correcting the error; and as he has failed to convince me, I thought it but proper to state some of the reasons why I had not yet embraced his views. I assure you, sir, as I have before said, that I am no great politician. I should be unwilling to introduce the subject into your paper on party grounds, and should be sorry to see it in these days of excitement, introduced by others far before me in political acquirements. I hope so far as we have gone, we have not transcended the limits of political economy—one of the branches not improperly introduced for the general good.

If I have wandered from "home" into a wilderness, I have met with a native of our own state, (in No. 3, Farm. Reg. pp. 138, 140,) whose company cheers me in the desert; who, upon the subject of the improvement of the James and Kanawha Rivers, says: "I have no hesitation in saying it would have been better for Virginia to have borrowed the whole sum instead of raising it at home by subscription; for I have no doubt that the tolls on the improvement will ultimately pay much more than interest on the money expended, &c." Again the same writer, Professor Dew, says: "I do not, however, by the remarks made, wish to be considered as censuring those who favor the joint-stock scheme of our state. It was the only plan perhaps which could have been successfully carried through, and therefore ought certainly to have been supported rather than leave the state without any improvement at all."

T. B. A.

P. S. My remarks have run in rather a different channel from that I had intended. I wished to have speculated a little upon your theories in your work on Calcareous Manures. I wished also to ask the favor that you would collect and publish in your Register, the best information upon the use of quicklime upon different soils.

* We think that our correspondent does great injustice to the *wind* in making it the cause of such effects. The wind is honest and "straight forward"—and, whether it is doing us good or harm, we can at least always tell which way it is blowing for the time being.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

[Continued from p. 222 Vol. III.]

On the treatment and rearing of house-lambs.

In the preceding chapter, the treatment of lambs intended to be kept for stock, has been chiefly regarded; but, as the price given in the winter, in the metropolis, and in other places where there is a demand for young lambs, is often very considerable, we shall, at present, confine our attention to the rearing of those animals, under cover, in which case they are denominated *house-lambs.*

In this branch of rural economy, two circumstances are worthy of notice: 1. To put the rams and ewes together at such a time, that the lambs may fall at the proper season; an object which may be easily effected by any skilful shepherd: and, 2. That appropriate places be provided for their reception. Where the suckling of house-lambs is intended to be regularly followed, it will be necessary to erect a house of such proportions as the probable extent of the business may require, and to divide the building into pens, in order that each lamb may be more conveniently suckled; but when it is not a primary object of attention, any airy building may be made to answer the purpose. Care should also be taken, not to crowd too many into one house at the same time; as the increased degree of heat, thus occasioned, will render the place unwholesome.

The breed of ewes, best calculated for producing house-lambs, is the early Dorsetshire sort, particularly those whose lambs die *fair*, in the language of the market; i e. whose flesh is of a delicately-white color: and from this prolific variety the demands of the luxurious in the metropolis are supplied. The dams are fed with hay, oil-cake, corn, cabbage, or any green food afforded by the season; which is given in an inclosure adjoining the apartment where the young lambs are confined. The light is excluded from the lambs excepting at the intervals when the shepherd suckles them upon the ewes; and some feeders confine them in separate stalls in order to prevent them from playing, and thus promoting their fatting, but others deem the exclusion of light to be sufficient.

Where the system of suckling is carried on to a great extent, it will be advisable to mark the lambs, in order to ascertain which has been longest sucking on the *bastard ewe;* (i. e. such as suckle strange lambs,) as such lambs ought to *suck a-head*, or be permitted to take the first milk. There is great difficulty in compelling the ewes to suckle strange lambs; but when they have lost their own by accident, they may be deceived by stripping the skin from the dead lamb, and stitching it round the body of a live one.

In the intervals of suckling, some wheat straw may be given to the lambs in racks, either with wheat or bruised peas in troughs, together with a piece of calcined chalk for them to lick, but as the ewe's milk is the chief support of their young, especial care must be taken to supply her with turnips; or, in case these or other roots cannot be procured, besides turning her into a good warm pasture, she should be fed with brewers' grains, to which may be added a little hay, oats, or bran; but the last mentioned articles are greatly inferior to turnips, or any of the succulent roots, in producing a flow of milk.

The ewes ought to be conducted to the lambs three or four times in the day, at nearly equidistant periods; and if any one have a more than ordinary flow of milk, she may be held by the head, while a second lamb draws the udder. During the whole of the treatment, the strictest attention ought to be paid to cleanliness; to promote which, the pens should be well littered with fresh straw; and, by this simple expedient, the animals will, if kept free from all disturbance, speedily fatten, and their flesh becomes exceedingly white and delicate. Some estimate may be formed of the profit arising from rearing house-lambs, from the prices given *per quarter* in the London markets. These, retail, vary from ten to fifteen, or twenty shillings, according to the demand, so that each lamb sells at from two to four pounds; though the prices afterwards gradually decline, till the ensuing spring affords an abundant supply for the table. Yet, whether from the great trouble of the requisite attendance, or from the precariousness of the result, it is a remarkable fact that, notwithstanding the increase of population, the rearing of house-lambs has, of late years, materially fallen off.

On the feeding of sheep.

The successful feeding of sheep must greatly depend on the quality of the pasture intended for their reception, and upon the resources which the farmer has for supplying them with food during the trying winter months. Hence, as already intimated, it will be necessary to suit them to the pasture, and on no account to purchase or procure sheep from the grounds of a superior quality to those which are destined for their support. With sheep, as with other cattle stock, it has been found that the larger breeds are calculated only for the richest and most luxuriant grounds, while the smaller sorts are best adapted for the less fertile tracts, where the grass is shorter; and as the breeds that are most beneficial for particular situations are detailed in the introductory view prefixed to this book, we deem any further remark on that subject unnecessary.

In the grazing of sheep, as well as neat cattle, various methods are practised, and with different success. Thus some farmers buy two, or three-shear wethers, early in May, which, for several weeks, are indifferently kept till all the grass has been mown off the meadows, when they are turned into the rowen, and are afterwards *forced* or fattened off on turnips, hay, and oil-cake, during the winter months, so as to be fit for sale at the commencement of march. This practice is very beneficial, if conducted with care, as mutton fetches the most advantageous prices in that month.

Others purchase pregnant ewes towards the close of summer, or early in the autumnal quarter; and keep them on inferior grass lands, stubbles, or fallow, till the beginning of the following year, when they are kept in good condition through the lambing season, and after that in the best manner that circumstances will admit: so that the lambs may be ready for sale in sufficient time for the dams to be fattened for the butcher early in autumn.

Another profitable practice on good soils is, the buying of lambs of forward breeds, about the end of August, or in the beginning of the following month. The animals thus acquired are, by some graziers, kept in an indifferent way throughout the winter, till the following spring, when they are turned into rich pasture, and fattened so as to be ready for sale before Christmas, at which time the whole stock are cleared off the land. Others however, adopt a system altogether the reverse of this: having purchased the sheep, as already stated, they force them with the best keep that can be procured, and dispose of them as quickly as possible. Each of these plans has its separate advocates; they are all good; and the preference to either can only be determined by relative circumstances of soil and situation, the quantity and the nature of the feed.

In grazing sheep, the fine grasses produced on downs are, undoubtedly, the best and most congenial food for these animals; and, on such soils, both the finest wool and the best mutton are produced; but in order to bring sheep forward at an earlier age than would be possible on such herbage, and for the larger breeds reared on lowlands, richer pasture is necessary: good hay alone will fatten wethers; but they may be yet more advantageously prepared for the butcher by means of grass and hay together. Great attention, however, is necessary, that sheep be kept from all grass that is grown in marshy places, otherwise they will become affected with the rot. And here it may not be amiss to remark, that the late Mr. Bakewell attributed this fatal disease solely to flooded lands, and the premature, but unsubstantial, herbage afforded by them. Whenever, therefore, particular lots or parcels of his sheep were thus affected, his practice was to fatten them for the butcher; and, probably from motives of jealousy, in order that he might be certain the animals would be killed, and not got into other hands, he was said to rot them before they were disposed of. This he effected by overflowing a pasture or meadow in the summer, in consequence of which the soil thus flooded inevitably rotted the sheep that were fed on it in the ensuing autumn: but this, it should be observed, does not apply to irrigated land, if properly managed.*

Beside humid situations, and the acid grass vegetating there, the tufts of long, rank grass that usually spring up after horse-dung, are injurious, unless the grass has been previously exposed to a few nights' frost, after which they may be turned

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*See Book VIII. Chap. XI.

in without danger. It is also improper to suffer sheep to browse upon fallows that are wet and unsound, as they frequently pull up unwholesome herbs by the roots, which they eat with the dirt adhering to them. This has been thought to give them the rot; though there is much reason to doubt the accuracy of that supposition, which, indeed, is manifestly at variance with the fact, that sheep fed on turnips, with which they necessarily lick up dirt, are not thereby affected with it, though they may be injured by the weeds. The origin of the rot, so far as it has been ascertained, is solely attributable to the wetness of the land on which sheep are fed; and its immediate effect is the production of insects, termed *flukes* or *flocks*, which prey upon the liver; but whether these are generated in the animal by the nature of the food, or are derived from animalculæ absorbed with it, is still unknown. It is observable that salt marshes are exempt from this malady; and therefore salt has, not unreasonably, been conjectured to afford a preventive, but its effects have not been sufficiently tried: the best is a dry pasture. In such pastures, however, as are subject to give sheep the rot at certain times, it will be advisable to let the lambs run with the ewes; the longer the better: for though these tender animals are more susceptible of injury in these unsound places than full-grown sheep, yet they are seldom attacked with the rot, suckling having been found a preservative against it.

In turning sheep into pastures, particularly water-meadows, and also into those places that are subject to rot, it will be necessary to pursue the same precaution as with neat cattle, viz. previously to satisfy the craving of appetite, by giving them hay or cut straw; and, after the dew has been evaporated by the rays of the sun, to drive them gently round the field for two or three hours, before they are suffered to feed. But, whenever any sort of dry food is given, they ought to be supplied with pure water, particularly during the intense heat that usually prevails during the *dog-days*, and which often renders the grass as dry as stubble. For this purpose, clear, light running water is always to be preferred, where it can be obtained; though, in general, whatever water presents itself is made use of.*

The best time for turning sheep into summer pastures is in May, when every attention should be paid to proportion the number according to the luxuriance of the grass; and, as these animals are with difficulty restored to good condition when injured by want of sufficient food, it will be advisable rather to understock than to overburthen the land. It is, however, worthy of notice, that by pursuing a system of *close feeding*, the plants will be prevented from running up to seed, and those grasses, which are naturally coarse and unprofitable, will thus be kept down, and become sweet and valuable. The number to be allotted to an acre depending on the weight of the stock, the richness of the soil, and the forwardness of the pasture, it must be evident that no general rule can be applicable to this portion of management, which must be wholly regulated by the combination of those circumstances.

Of late years, it has become a frequent practice to soil sheep during summer with the various artificial grasses, and to supply them with corn, as well as green food, during winter. In this view, barley-meal, when abundant and cheap, may be advantageously combined with green meat, and will speedily fatten wethers: pulverized oil-cake has also been given; but has been objected to, as it is apt to impart a peculiar flavor to the mutton. Pea-haulm is much relished by sheep; and potatoes, particularly if steamed, would rapidly contribute to fatten them, were not the operation attended with two much trouble for the feeding of a flock. Borecole and burnet also supply an excellent food for sheep during the winter, particularly towards the close of that season; but in most situations turnips form the farmer's chief dependence for the winter-keep of his sheep-stock.

There are various methods in the use of giving turnips to sheep. By some farmers, they are promiscuously turned into a field, and allowed to eat the roots at pleasure; either previously picking these out of the ground for their use, or leaving the sheep to do that themselves. Others divide their land by hurdles, and inclose the sheep in such a space as these can clear in one day, advancing progressively through the field till it is cleared. But, in either case, care should be taken not to turn them in until the dew is off in the morning, as by their eating the turnip-tops they would be subject to become hoved. Another method is, to pull up such a quantity of turnips as they can consume in a few days, and cart them off the land to the sheep pastures; and in wet weather, or when it is an object to feed off the turnips on the ground on which they are grown, this is an advisable mode.

Each of these methods has its advantages; but a more profitable plan than either, is to eat off the crop by two successive flocks of fattening and store sheep. By allowing the first the range of the field, they will scoop out such turnips as they prefer, and will thus satisfy their appetites better than where the turnips are dug up: a most material point, it may be observed, to be considered in fattening all cattle, which should always be indulged, when that is possible, with such food as they prefer. The store sheep may then follow, and the roots and pieces left by the former should then be taken up for their use. One man with a common picker, used for the purpose, will turn out and break as many as will serve a large flock, and his hire will be more than compensated by their being eaten

* The watering of sheep is on the continent, regarded as a circumstance of the greatest moment, and accordingly receives that attention which it requires. Thus in Sweden, and at the national farm at Rambouillet, in France, they are daily watered with running water, or with that obtained from lakes and springs; stagnant water being most properly and rigorously prohibited. In some of the Saxon sheep-farms, the sheep are watered in the cots or folds during the winter, instead of taking them to watering-places. Spring or well water is conducted, by means of pipes, into troughs, out of which the sheep drink at pleasure; they in consequence drink oftener, and each time take less water, which is favorable to their health. The ordinary mode of watering sheep in that, and, we may add, in many parts of our country, is attended with many inconveniences. The animals refuse to drink water in the winter, if it be too cold; they hurry while drinking; and do not take enough when the weather is very windy, or hail, rain, or snow falls. Besides which, they often disturb the water with their feet; this disgusts them, and at length, one part of the flock completely prevents the other from approaching the watering-place.

clean up; while, if that were done by the fattening flock, it would perhaps rather check than forward their improvement. When the turnips are hurdled off to be eaten on the land, they should always be taken up; as otherwise, in so small a space, they would be trodden under and spoiled; if not taken up, the sheep should be allowed more room.

But the fattening of sheep cannot be conducted to advantage without regularity in distributing, and economy in the management of, the various articles that compose their food. Hence it will be found useful to have troughs, with partitions in the middle and racks annexed, about two feet high from the ground, the whole being firm and steady, so that it cannot be overturned.

The sheep-cribs and racks in common use, are too well known to require description. Considerable benefit may be derived from their adoption for the purpose of feeding sheep; for it not only effects a material reduction in the consumption and expense of provender, which is thus prevented from being trodden under foot, or soiled with dung; but also, in this state of separation, the stronger sheep cannot drive away the weaker, as each is secured by the head.

But whatever system of management may be adopted by the farmer, whether at home or in the field, he ought on no account to withhold salt from his sheep; for not only does the continual use of that article contribute to the digestion of succulent vegetables, and of course preserve the animals in constant health, but it is also said to improve both the quantity and the quality of the wool, and it ought to be particularly used in those moist situations, the produce of which is liable to rot sheep, of which malady it is affirmed to be both a preventive and a cure. Rock-salt is undoubtedly preferable; but, where this cannot be conveniently procured, it will be advisable to dissolve common salt in water, and after mixing it with fine, pure clay, or with pulverized and sifted chalk, to form the whole into masses or lumps, which may be placed under shelter, so that the sheep may lick it at pleasure.

The importance of salt in preserving the health of sheep is not generally known, or appreciated, by many breeders of this island, who do not give it in any form. The same prejudice exists in Prussia and Holland, where no salt is allowed to these animals.* On the contrary, at Rambouillet, in Silesia, Saxony, Sweden and Spain, salt is considered as a most important article, and the use of it is most strongly recommended. In Sweden, they give salt, particularly in rainy or damp weather, and frequently add to it wormwood, or some other bitter vegetables, juniper seeds or berries, and even pitch, which articles are reduced to powder, and, after being diluted with water, are carried to the sheep house, and put into the trunks of trees, which are excavated expressly for this purpose: the preparation is considered as an excellent preventive of several distempers, particularly the dropsy, to which the Swedish sheep are very liable. In this country, the high duty on salt has hitherto prevented its employment for many agricultural purposes, to which it might be beneficially applied; and to none more advantageously than in the feeding of cattle; but as that objection now happily, no longer exists, it is to be presumed that it will be gradually brought into use.

*In Holland, the use of alder leaves, which the sheep eat with uncommon avidity in wet weather, is said to prevent the rot.

The preceding statements have been given chiefly with reference to the fattening of sheep profitably for the market; but it ought never to be forgotten, that the growth of the wool is liable to be materially affected by the system of feeding pursued. It is essential to the evenness and strength of the staple, that the feeding of the animal should be uniform, without any sudden interruption or transition: for, where this is suffered to take place, the natural progress of the wool is checked; a second growth succeeds; and the point of contact becomes so weak as to snap under the operation of the manufacturer; who, being aware of this disadvantage, cannot of course afford such a price for wool of this description, as he could for that of a more perfect staple. Much wool is injured in this way between summer and winter keep, which should be made to blend as gradually as possible, that the mischief above described might be prevented, and a sudden transition from rich to poor diet or from poor to rich keep, ought carefully to be avoided.

[To be continued.]

From Loudon's Gardener's Magazine.

TO PRESERVE CELERY THROUGH THE WINTER.

Get up the celery on a fine dry day before it is injured by frost, cut off the leaves and roots, and lay it in a dry, airy place for a few days; then remove it to a cool cellar, where it will be quite secure from frost, and pack it up with sand, putting layers of celery and of sand alternately.

STEAM-DIGGING MACHINE.

M. Wronski, a celebrated mathematician at Paris, has, according to the Paris papers, discovered a new system of applying steam to carriages, digging machines, hoes, picks, ploughs, &c.; so superior to any thing hitherto known, that a French company has bought his patent for four millions of francs.—*Le Temps*.

From the Farmer and Gardener.

LIMING IN LEHIGH.

In speaking more particularly of Lehigh county, it may be assumed, that the introduction of the use of lime in farming, and the culture of clover about 20 years ago, wrought a most salutary revolution, and saved the second and third rate lands from being deserted for the far west. Ever since that period agriculture is rising. Every summer adds to the number of solid and capacious barns, and old ones are enlarged. A considerable part of the county, especially on the borders of the Lehigh and its tributaries, is limestone land, but the trouble and expense of carting the stones the distance of 14 miles is not thought too much, thus almost the whole of our county is provided with this commodity. As soon as winter sets in, or as often as during summer the other farm operations are suspended, the quarries present a lively scene, and wagons or sledges are seen toiling along up and down through the country, broken and hilly as it is in many parts. The consequence is, that you see beautiful farms not only in hollow lands, but in situations where you never would look for them, on the tops of the mountains as well as on their declivities. Wheat however is not the only staple article; we produce a great quantity of rye for sale and home consumption, for man and beast; for be it remembered that we eat rye bread in preference, even when we have both sorts on the table. The effect of lime upon rye land is quick and immediate, hence whoever is improving his land begins with rye. On the Lehigh land quarried limestones are sold at the quarries for 25 cents per ton. In other sections, the common way is for farmers to do all the labor themselves and pay to the owner of the quarry 6 cents for every ten bushels of quicklime they draw from the kiln, or they engage hands paying to them from 1 to 1½ cents per bushel of quicklime, the hands to find their own tools and powder where necessary—this is in addition to the fees of the owner of the quarry. The work at the kiln to be done by the farmers. If you wish to buy quicklime you can have it deposited on the fields at ten cents per bushel and upwards, according to distances. We put from 40 to 60 bushels on the acre, repeating the operation every five years. From the time that stone coal from Mauch Chunk has been furnished in abundance along the Lehigh canal, and that its use in burning lime has been understood, agriculture has received a new start. Previously, the scarcity of fuel—though rather prospective than actual, operated as a check upon the universal use of lime. Now the coal is mixed with the lime stones, and no more wood is required but what is necessary to ignite the coal, which may be done with 1 or 1½ cords, thus not only a mass of fuel is saved, but a great deal of hard labor—the coal when once fairly burning requiring no farther attendance.

Timothy is not much raised on dry land, as its effect upon the land is not so beneficial as that of clover. Common rotation, 1st. clover, 2d Indian corn, 3d oats or flax; and potatoes, manure, 4th wheat, 5th and 6th clover, 7th wheat, without manure; 20 bushels of wheat—50 bushels of Indian corn, 2 tons of clover per acre, are good crops, though there are many instances of more having been produced. Average somewhat below this.

For the benefit of such as wish to sprout a few seeds of gama grass, let me add my recipe. Split the seed with a small chisel, put the kernel in a tumbler with sand, keep it moist, and in 3 days, if the seeds are not covered too deeply, the grass appears. The splitting is easily done. The seed of gama grass is in the shape of a cylinder, on the surface of which you will observe a spheric triangle, two sides being formed by seams, and the third by the base of the seed, but the two sides or seams, one not quite connected with the base, make the connection with the chisel or knife, and the triangle will fall out like a trap door, the kernel adhering to it; take care not to separate it further, or injure it, which is very easy to avoid.

From the Tennessee Farmer.

TO DESTROY BRIERS.

We are assured by a respectable and intelligent farmer, that from the repeated experiments of himself and his neighbors, he is able to state with confidence that briers, both the blackberry and dewberry, will be effectually destroyed by cutting them down or ploughing them up when they are in full bloom, which is ordinarily in the month of May.

From the Tennessee Farmer.

SAVING CLOVER SEED.

Answer to Queries of a subscriber published in the Farmer No. 6 page 91.

The two great objects to be attended to, in raising clover seed with profit, are—first, to secure the production of as large a crop to the acre as practicable—and secondly, to harvest the crop in such a manner, as to bring as large a portion of the seed into the barn and to leave as small a portion of it as possible in the field.

To attain the first object, that of securing a large product, we have in our preceding numbers, in observations on the culture of clover, given the necessary directions; we will now only repeat, that the main things to be attended to are the following—1st. That the land be fertile. 2d. That it be well prepared before sowing the seed, as heretofore directed. 3d. That a sufficient quantity of seed be sown to the acre. 4th. That it be evenly distributed over the ground. 5th. That, whenever the land requires its aid, gypsum or plaster be sown on the clover—and 6th. That it be not injured by injudicious or excessive grazing. If these particulars be well attended to, an acre of ordinary land will produce three bushels of seed in a common season, often more.

We come now to speak of the more difficult and laborious operation of safely and economically harvesting and securing it. This requires care and attention. The great objects to be aimed at are, to cut the seed at the period when there is the largest portion of the ripe seed on the ground, in that stage of maturity, which will admit of its being collected into the barn, and so to handle it, as to prevent the seed from being shattered off and left on the field, while the straw or haulm only is collected in the barn. It is, we believe to the improvident and ruinous neglect of strict attention to these two latter objects, that most farmers may attribute their failure in making clover seed. We will lay before our readers the results of our own observation and experience, on these important points, hoping that those of our patrons, who may have discovered a better mode of effecting these objects, than the one recommended, will yet communicate to us their practice in time to enable us to lay it before the public in our next number.

Time of cutting.

As the clover seed, from the time the first heads ripen, until the close of the season, are daily arriving at maturity, the great desideratum is, to ascertain the precise period when there is on the ground the greatest portion of ripe seed, in a state which will admit of its being collected and brought into the barn. If the clover be cut before this period, there must evidently be a loss sustained, from the immaturity of too large a portion of the seed. If the cutting be deferred beyond this period, an equal, and perhaps a greater loss will be sustained, from the impossibility of saving the seed first ripened, generally the best, on account of its being so easily shattered off. We would recommend, as the most eligible time for cutting, the period when about two-thirds of the heads have become ripe and assumed a black color, many of the others, at this time of a brown color, will ripen after cutting.

Mode of cutting.

Where the clover has not lodged, and is high enough to admit of it, by far the most expeditious, and in every point of view the most eligible mode of cutting, is to cradle it as we do grain, only throwing it into double swarths, that is laying the clover cut from two lands in one swarth. If the grass be so short as to require it, a strip of linen may be fastened on the fingers of the cradle so as to prevent the heads falling through them.

Mode of curing.

If the crop be not heavy and the weather be good, the swarths may lie undisturbed for several days, until the hay be perfectly cured, it should then, in the morning or evening while sufficiently moist from the dew, to prevent its shattering off too easily, be gently raked into small bunches, such as can be conveniently raised with a fork and laid on the wagon. When not too damp, these bunches should be hauled to the barn, and either stowed away in mows, or, which is best, thrashed off, and either immediately cleaned, or else the heads stowed away in a room prepared for the purpose until winter, to be then thrashed or trodden out. But should there be rain on them, or should they be suffered to remain in the field any considerable length of time after being raked up, these bunches must with a fork be gently turned bottom upwards, and laid in a new place, after every rain to which they may be exposed, and after every two or three days they may have lain in the field in fair weather. This is necessary to prevent the seed from being injured by the heat and moisture to which they will have been exposed, from the sun, the rain, and the moisture of the earth. After being sufficiently cured, while dry, let the seed be gently laid on the wagon or sled, and hauled to the barn, using every necessary precaution to ensure, that as little of it as possible be left in the field or scattered along the road.

Mode of cleaning.

Various methods are practised, for cleaning the seed from the chaff. The only two as far as we know, used in this country, are treading it out with horses, or cleaning it in a thrashing machine: The first is tedious, laborious, filthy and unwholesome both to man and beast, the latter is far preferable in every respect, but as all are not provided with thrashing machines and as therefore many must still continue to tread out their seed we will submit a few observations on the mode of performing this operation. Having covered the barn floor with seed in the chaff to the depth of from 12 to 18 inches, put on the horses and tread one day, the next morning run the chaff through a fan, much of it will have been beaten to dust and will be blown away, as will also the light chaff, having no seed, and that from which the seed has been separated, but much the larger portion of the seed, still enveloped in the chaff, will be found in the rear of the fan, this, having been separated from the empty chaff adjoining it, must be again spread on the floor and having added another portion of untrodden chaff, the horses must be again put on and made to tread it another day when it should be again run through the fan as before, the produce of this, will far exceed that of the first day's treading, but still, much good seed will be found immediately in the rear of the fan not yet separated from the chaff—this must be again spread on the floor, and a new addition be made of untrodden chaff, and this process must be repeated until the whole crop is trodden out. The seed, after passing through the fan, should first be run through a sieve, sufficiently coarse to permit the clover seed to pass through, but retaining all larger seeds and trash. It should then be again run through a finer sieve, retaining the clover seed, but permitting the passage through of all smaller substances, by these two processes, the clover seed will be thoroughly cleansed from all kinds of filth and prepared for market. The only advantages derived from cleaning the seed rather than sowing it in the chaff, are the ascertaining with greater certainty the quantity sown and the ensuring a more equal distribution of the seed—where therefore, a sufficient quantity can be afforded to insure the desired thickness in every part of the ground, sowing in the chaff, will not only do as well, but is to be preferred, as it is believed more likely to come up and to stand.

From the Silk Culturist.

SEED TIME FOR THE MULBERRY.

South Coventry, (Conn.) June 25th, 1835.

Sir—The scarcity of mulberry seed the present season having prevented many persons from sowing nurseries in the spring, I take the liberty of informing them through the medium of your paper, that from experiment, I am satisfied that the month of August is a suitable season for sowing the seed. If sown any time during the month of August the seed will vegetate quickly, and by the time of the early autumnal frosts, the plants will have grown to the height of three or four inches. They may then be easily covered with straw and horse manure, which will sufficiently protect them through the winter. In covering them but little straw should be used, otherwise, the rats and mice may be induced to burrow in it, in which case they will most assuredly destroy the plants. If the seed is sown at this season and protected in this manner, they start early the following spring, grow vigorously through the summer, and by autumn attain about the same height as though sown the preceding spring. Another advantage from sowing in August is that seed of the same year's growth may be obtained, which is more sure to vegetate.

J. W. BOYNTON.

SELECTION OF SEED.

* * * The important topic, of the selection of seeds, opens this number, [of the New York Farmer] examples are quoted to show that the successive selection of seed from choice

plants grown in the same situation, is to be preferred to any benefit which changes of seed from distant localities can produce. We in the South practice on the opposite system very extensively; the planters of Bayou Bœuf grow cotton seed from Mexico, and furnish seed to the planters of Petit Gulf; these in their turn supply Louisiana, Mississippi, and Alabama, and from them our Petit Gulf cotton seed comes—gradual changes take place in its character here, and the genuine variety is kept up by annual importations.

It is not to be doubted that instances occur of remarkable improvement both in the quality and quantity of our rice crops upon the use of North Carolina seed rice. And it has been the settled habit of our rice planters from the commencement of that culture on our River Swamps, to draw their supplies of seed from the Inland Swamps; this shows a deep conviction of the advantage derived from change of seed.

On the other hand, Mr. Gibbes, of Chester district, in this state, grows corn known there as the three eared corn, which his neighbors buy for its prolific tendency; this he obtained by selecting stalks having three ears; and every body knows that of late our Sea Island planters have been zealous in the selection of fine samples from their crops for seed; so far was this intent examination carried in one instance, that the long use of magnifying glasses, to aid in selecting the finest fibre, threatened blindness to one gentleman of John's Island, as we are told. he is rewarded by sending to market a "fancy brand."—*South. Agr.*

For the Farmers' Register.

DESULTORY OBSERVATIONS, AND INQUIRIES, ON THE IMPROVEMENT OF LAND.

Charlotte, Va. Aug. 1, 1835.

We are disputing in this section of country whether the three or four-shift system is most suitable to our lands, and I propose making a few remarks relative to this question, as well as some desultory observations on other matters connected with the subject of agriculture.

In order to arrive at any thing like accurate conclusions, it is necessary first to define the terms three and four-shift system, as used in this communication. By the three-shift system, we mean a farm divided into three equal parts, cultivated successively, one year in corn, one in oats, and one in grass. By the four-shift system, we mean a farm divided into four equal parts, cultivated successively one year in corn, one in oats, and two in grass. From this it will appear that on the three-shift plan there is in fact but *one year's rest*—and on the four-shift plan only two—which in my humble opinion, is but a slender chance for *improvement*—that is, where we depend on *grass alone*.

The farm on which I now reside, has been under what is called the four-shift system, for something like fourteen years—eleven of which, I can safely say, there has been little or no grazing during the spring and summer. Occasionally in the months of November and December I have permitted my cows, and sometimes a small head of horses, to glean the fields. My stock of hogs never yet enjoyed the pleasure of the harvest field more than twice or thrice during the fourteen years; and strange to tell, I have never bought pork or bacon, except the two first years of my little farming career. The different shifts have been tolerably well set with herds grass or clover, (wherever either of these grasses would grow) for the greater part, if not the whole time above mentioned. Still my lands are poor and unproductive—and I am now in what is commonly called a *quandary*. Shall I continue my efforts on the four-shift plan—or shall I abandon all hope, and try the three-shift system?

It would, Mr. Editor, be a source of much gratification not only to the writer of this article, but also to many other readers of your valuable Register, to see this subject fully discussed by some of your able and practical correspondents from the tobacco growing country. The excellent remarks already published in your columns, relative to the three and four-shift systems, apply more particularly to the wheat growing country. My opinion, though entitled to but little weight, if any, rather inclines to *change*; and the reasons which influence my mind in relation to this important subject, will be candidly and plainly submitted to you and your readers.

The first which suggests itself in favor of the three-shift, is, a greater proportion of the best land of the farm will annually be brought into cultivation. Now, in order to elucidate this idea as clear as possible, let us take for example, a tract or farm containing 320,000 corn hills, and where tobacco, corn and oats are cultivated, (as is common here) 8,000 per hand of each, is considered fair cropping for an average parcel of hands, although 10, and sometimes 12,000 per hand is cultivated. This 320,000 divided into four-shifts, and worked by ten hands, gives four shifts of 80,000 each. If the same farm be divided into three-shifts, and managed by the same force, we have three shifts, containing about 106,000 hills each. Out of this we may select the best 80,000 for the year's work. The remaining surplus of 26,000 may be sowed down in small grain, which will not materially interfere with, or affect the general management of the crop; or it may be suffered to *improve* by *rest*, and be occasionally cultivated, as time and circumstances may direct. From this view of the question, it would appear a matter easily decided: but then another question arises—does the land improve as much when cultivated once in three years, as when cultivated only once in four? Experience, as already remarked, is but a small inducement with me to hope for much *improvement* to our common lands from *grass alone;* and we may add to this, the combined advantage of non-grazing and deep ploughing. These remarks are intended to apply only to the common corn land of this section of country, or to lands of a midling quality, for there is not the least doubt that fresh land of good quality, or even old land in good heart, under judicious cultivation, with the use of clover, may be not only kept up to its original fertility, but is susceptible of a high degree of improvement. But on the common corn land let me ask what is the improvement of three or four years worth, when, as before remarked, that of ten or a dozen is scarcely perceptible?

Another advantage which the three-shift system possesses, consists in the great saving of labor both in the preparation and cultivation of the crop. It generally requires the greater part of my hands to shrub and clean up the briers, bushes, &c. nearly the whole time of the ploughing season, (say from the 15th November till the 15th of January,) in order to keep the ploughs in motion. This labor would be considerably diminished under the three-shift plan, for the plain and obvious reason, that a bush or shrub is easily cut off, or taken up, at one or two years old, when if permitted to grow, and increase in number, another twelve-months, the labor would be increased nearly two-fold; and we all know the difference between working a field recently cultivated, and one that has not been disturbed for a longer period of time.

Again the three-shift system offers a great inducement to abandon that *pest* on all stiff high land, called *herds grass;* for on the four-shift system with this grass, we only reap the advantage of the grass the last or fourth year, it being hardly discernable the year after seeding; whilst on the three-shift plan we may avail ourselves of the use of clover, which springs up earlier, and affords a much better covering to the land. The clover crop on good high land, and with seasonable weather, may be used moderately the year it is seeded, and yields one of its best crops the succeeding year—which may be called a "nimble shilling," and according to the old adage, is worth at least a "slow dollar."

Lastly by adopting the three-shift plan, the farmer is enabled to turn his attention more to the subject of manure, which to the vegetable kingdom is of the same importance, and sustains the same relation, that bread does to the animal kingdom. And we are here led to ask what is the best application of manure, or what is the best system of manuring? Shall we apply the little that is made to the poor worn-out spots? or shall we give it to those parts of the field which are in better condition? It surely cannot be sound policy to give one bushel of manure to a gulley which will scarcely compensate us for *the time* required to scatter it on—especially whilst we have so much land of a better grade, that will, on a moderate calculation, pay us double.

I have thought, Mr. Editor, for a long time, that many of us who make great pretensions to the subject of *improvement*, commence at the wrong end of the chapter. What would be the difference of product in applying manure to an acre of exhausted land—and applying the same quantity to an acre in good condition? Suppose a certain small quantity of manure applied to an acre which will produce without that aid, one barrel, and the gain should be one-tenth—would an acre capable of producing *two barrels*, gain only one-tenth? But if each acre gains one-tenth, does it not follow as a consequence, that we have taken the wrong end first? Does manure increase the productive capacity of soil in proportion to the quantity applied; or is it in proportion to the fertility of the soil previous to the application of manure? I do not suppose the productive capacity of soil can be the law regulating the increase, unless by that capacity we mean the fertilizing matter already contained in the soil, which possibly may be the case, and is perhaps exemplified in the application of plaster—for we can scarcely believe the very small portion of plaster generally used, could have the effect so frequently seen, unless we reason on this hypothesis. But as a general rule, I am disposed to think the *increase* from manure, is in proportion to the fertilizing matter already contained in the soil, and a particular adaptation of this manure to the soil. Let us take four lots of land Nos. 1, 2, 3 and 4, differing in point of fertility according to their respective numbers; that is, No. 1, producing one barrel—No. 2, producing two barrels, &c. Now, supposing that the same small quantity of manure is applied to each of these lots, which lot will give the greatest return for the application? The gain of No. 1, taking a tenth for the increased production, is one-half bushel—No. 2, gains one bushel—No. 3, gains one and a half—whilst No. 4, gains two bushels, thus showing an increase of product for the same labor and expense, of 300 per cent. This perhaps would be the result until the soil is brought up to its highest point of productiveness, or nearly so, at which time we might take the next number, and so on, until we shall have completed the rotation.

The policy of this course arises from the simple fact, that under present circumstances, we are put up to all that we can do, to make both ends meet, and the plan proposed provides for the *present* a more plentiful return, whilst for the *future* we may remember the proverb—"Sufficient unto the day is the evil thereof."

Opinions on these matters, from any of the readers of the Farmers' Register are respectfully solicited by a subscriber from

CHARLOTTE COUNTY.

ON SAVING CLOVER SEED.

To the Editor of the Farmers' Register.

Granville, N. C. Aug. 1835.

The following extract of a letter was handed me by a friend, a copy of which I send you for insertion in the Farmers' Register. The cause of agriculture is to some extent interested in the dissemination of information upon the subject of this letter. There exists in this section of country a strong prejudice against the use of clover seed sold by the merchant, from the danger of introducing nettles, and other pestiferous plants—and besides, the cost is in a great many instances, an objection to the buying of them. I hope some one of your readers is in possession of a more convenient and speedy means of saving these seed, than the one described below. If so, he would confer a favor on the public by publishing it through the columns of the Register. I should myself be particularly gratified, by seeing a comparative estimate of the trouble and labor of saving the seed, with the cost of purchasing them.

Extract of a letter from Dunkerque in France, in answer to inquiries respecting the culture and manner of saving clover seed in the north of France, and kingdom of Belgium.

DUNKERQUE, *Jan.* 7, 1834.

"The seed is sown from the month of March till about the 20th of May, in ground sown with wheat or oats. It ought to be sown in cloudy, foggy, or rainy weather, as hot sunny weather is apt prematurely to burn part of the seed, and of course make the crop thin on the ground at harvest.

When the wheat or oats are cut, the ground remains covered with the clover plant, which does not require the least care or trouble during the winter, unless being passed over by a wooden or iron roller, where the frost has rendered the ground too light. In the month of May of the following year, they pull out all the thistles, and other destructive weeds, and plants that may be likely to impede its growth, or be troublesome afterwards. In the beginning of July they cut the first crop of hay. This first crop does not give any seed, but the plant grows again, and it is in the second cutting or crop that they find the seed. It is for the farmer to judge when the plant is ripe enough to cut for seed. However, it appears necessary it should be quite ripe, or apparently dead. They then dry it well and stack it, and when dried or deadened, they thrash it out with flails, in the same way they formerly used to take out grain in Scotland. It is, however, very difficult to part the seeds from the husks of the clover plants, and then it requires all the skill and ingenuity of the farmers, with their fanners, rakes, sieves, &c. to cleanse it so as to please the English, and more especially the Scotch farmers. This plant is generally sown in land which requires rest, and is followed by a crop of wheat. Thus they will in the year 1833 have wheat in which they sow clover seed in 1834. They gather the harvest of clover seed in 1835—they have wheat again, and in 1836, a crop of flax. This mode of culture generally produces the finest quality of flax, but the land must be good and rich.

"If any further information regarding this or any other of our productions, can be useful to you, or your American friends, you know you have only to say so, and to command my services."

T.

The above you will publish or not, at your discretion, in the Farmers' Register. The subject attracted my notice from its being the first account I have seen of a method of saving clover seed. I hope (more for the benefit of my neighbors and others, than of myself, for I never expect to gather the seed, although I sow it to some extent, and intend to do so quite extensively hereafter,) it will turn out that the ingenuity of some of our Yankee brothers has already invented a machine or a mill, for the purpose. If they have not it seems to me from the nature of the thing, a matter of surprise. The introduction of clover into the county of Granville, is of recent date, and until the last two or three years, its successful cultivation was regarded as an experiment. This experiment has, however, been fairly made, and its success has fully realized the most sanguine expectations, so that the crop is now coming into common, and in some instances, into extensive use; and I doubt not will, with the herds grass and other artificial grasses, in the course of a very few years, greatly improve our system of agriculture. The doubts heretofore entertained with respect to the culture of clover, were formed with reference to the heat of our summer months, and not to the character of our soil, which is generally well adapted to the growth of tobacco and wheat, and of course, in the absence of other opposing influences, to clover.

[There are several objections to mowing clover to save the seed, for the farmer's own use. The stalks and leaves, which, if left, would help to enrich the land where they stood, are taken off, and with much labor, to be carried out again for the same purpose, even if not wasted. A large proportion of the seeds are harvested green, or, if waited for, to ripen, the early ripe will have been mostly wasted. Bad weather, after mowing, will cause much more loss of seed, either by shattering or sprouting. The seeds then must be separated from the stalks by treading or trashing, and fanning, at considerable cost of labor. Finally, all the seeds of bad weeds, ripe about the same time, are saved with the clover seed, and carefully sown over the other best parts of the farm.

There are contrivances to pull off the ripe heads of the clover, by means of an edge formed into long teeth like those of a comb. The smaller kinds are worked by hand—the larger drawn on wheels by a horse. This plan seems to be free from most of the objections stated above, and to promise well in theory. Nevertheless, in 40 years it has not worked its way any where into general use, and very few farmers in Virginia have used, or continue to use this plan.

There is another mode which would seem the most slow and tedious of all—but which we think decidedly preferable both to buying the seed, and to saving them by mowing and thrashing. This is to pull off the heads by hand. When there is plenty of crop to gather, and there is no objection to leaving a large proportion—and even though the growth is irregular or in spots—women, stout boys, and girls, will gather from eight to ten bushels each a day. These are of course only the heads containing ripe and perfect seed—and no seeds of bad weeds are mixed with them. The seed live and thrive better by being sown in the chaff—and the only objection is the great difficulty of regulating the quantity. If equally distributed, six bushels in the chaff are enough for an acre. In this manner every day's work is saved, by putting the seed in a house as fast as gathered. No bad weather causes loss, except by interrupting and preventing the gathering. Where there is the proper kind of labor to spare in August (which however never can be where there is cotton to pick out,) it is seldom so profitably employed as in this seemingly slow way of saving clover seed.]

THE IMPROVED POCKET CHONDROMETER.—SKINLESS OAT.

To the Editor of the Farmers' Register.

This being a very useful little implement, and probably not generally known to your subscribers, I take the liberty to send you a description of it, together with a copy of the printed table pasted on the inside of the small box containing the implement itself. Its use is to ascertain the weight per Winchester bushel, of all kinds of grain or seed, which it does very accurately. The principle on which it is constructed is that of the steelyard. It consists of a very neat little brass standard, six inches high, with a circular bottom about two inches diameter, a small bar about nine inches long, part brass and part steel—the brass part graduated, and having a small brass weight made to slide on it so as to mark by its edge the number of pounds per bushel, of the grain or seed intended to be weighed. For the other end of the bar there is a little brass bucket made to contain about a gill, struck measure, which is to be carefully filled with whatever you design to weigh, when the bar is fixed on the standard, and the brass weight being moved until it balances the filled bucket, ascertains precisely, the weight by the struck Winchester bushel.

Copy of the accompanying Table.

Seventeen specimens of marketable grain and seed.

Wheat is from	55 to	63 lbs. per bushel; mean wt.	59
Rye,	50	56	53
Barley,	45	49	47
Red clover,	60	64	62
White do.	66	70	68
Dutch clover,	65	71	68
Hemp,	38	42	40
Linseed,	44	50	47
Turnip,	48	50	49
Oats,	35	42	38½
Meadow grass,	10	18	14
Rye do.	12	20	16
Cinque foil,	22	28	25
Peas,	62	67	64½
Small beans,	60	66	63
Canary,	54	56	55
Rape,	47	50	48½

The use of this little implement will be obvious, I think, at first sight; for it furnishes, at once, a more convenient and expeditious mode than any I have known tried, of ascertaining the comparative weight of all our varieties of wheat, corn, rye, and oats; and as their value generally, is in proportion to their weight, it is a matter of some importance, as well as curiosity, for every farmer to possess so easy a means of ascertaining which is the heaviest. I have very often used this instrument, and in several instances, have sold my wheat by it—the purchaser being perfectly satisfied with this mode of determining the weight. By this I find the weight of the skinless oat to be 47 lbs., whereas the heaviest oats in England, (as you will see by the table,) weighs only 42 lbs. As you may never have seen this new variety, which has lately been introduced into England from China, and cultivated with great success, I send you a few grains as a sample. Last spring I purchased from one of William Prince's agents, in our neighborhood, a single quart, at the rate of $16 a bushel! One pint of these I drilled in my garden, nine inches apart, the wide way, and two inches the other, as near as I could prevail on the hands employed to drop the grains at that distance; but they were probably nearer. In this way the pint sowed 247 square yards, and produced 116 pints of such grain as I send you. The produce would have been something more; for three spots, each about six or seven feet square, were lodged, and consequently injured. The average height, when ripe, was about four feet, and the appearance then, by far the most beautiful of any small grain I ever saw. From the looks of the grain I should judge it would make very good flour; but for horse feed it must certainly be vastly superior to any other oat yet discovered. To judge by my single trial, they will make at least as much, by measure, as any of the kinds we cultivate, and will so far exceed them in weight as to give them a very decided preference. Be all this, however, as it may, I have determined to sow as many bushels of them next spring, as I can procure: not however, at sixteen dollars a bushel.

JAMES M. GARNETT.

MOVEMENTS OF THE ABOLITION SOCIETIES; AND ANTICIPATED RESULTS.

For some years past, the small, but growing and active sect of abolitionists in the Northern States, have been bringing their theories respecting slavery into practical operation: and the effects have recently assumed an importance which threatens seriously to affect both the agricultural interests and political rights of the Southern States. This sect, composed of bigoted and reckless zealots, who avow their aim to effect, if possible, the entire and immediate abolition of slavery, at all hazards, and without regard to consequences—has increased rapidly in numbers and strength. Nor is this strange. The detestation of slavery, in the abstract, is a feeling almost inseparable from man's best feelings; and thousands of slave holders—who will, if necessary, defend their rights against the attacks of the abolitionists, at the bayonet's point—would make far greater personal sacrifices, in any feasible and proper manner, to mitigate the evils, or remove, if possible, the existence of slavery, than those who condemn and denounce them. It is the easiest thing in the world to be charitable at the expense of other people—and there never will be a lack of fierce advocates for the removal of this evil, though by producing evils ten times greater, so long as all the losses and dangers from the change, whatever they may be, must fall on those far removed from the zealous and ferocious "philanthropists"—who are striving to put fire to a train of gunpowder, because they are in perfect safety from the awful and destructive explosion that may follow.

These societies, lately deemed so contemptible, and now perhaps as incorrectly elevated to a most imposing station of power and influence, are now using systematic efforts to reach their end. More than 200 affiliated abolition societies in the Northern States, have already been organized, to labor for the good or the ill of the South: large amounts of money have been collected—secret emissaries are employed in the South—from their presses numerous publications are issued, filled with misrepresentations and falsehoods, addressed to the supposed feelings of the slaves, and to the degraded understandings and besotted prejudices of the lower class of their northern countrymen—and these publications, through the mails, are sent free of carriage (to the publishers) to every part of the south, as well as of the north. These violent and open proceedings, and the strong suspicion that even worse are in secret operation, have roused the south, and drawn forth a burst of indignation, and expression of determined resistance, which will be universal. In this matter, at least, there are no party divisions to distract our views, and to prevent a united effort to maintain our interests and rights. Whatever may be the issue, the people of the south will, in defence of their rights and property, act as one man. Public meetings are every where called. They have been already held in Richmond and Petersburg, and with a unanimity without precedent, resolutions have been passed expressive of their feelings of indignation and of approval of such legal and proper measures, (and perhaps rather exceeding the legal limit,) as may be deemed necessary to guard against these assassin-like attempts. The circumstances of the very recent discovery of an intended insurrection of slaves in Mississippi, instigated, planned, and intended to be led (as is alleged) by white men, some of whom were emissaries of the northern abolitionists, have served to add fuel to the flame, and to increase the bitterness of denunciation, and of hostile feeling.

So far as the opinions of the South, (as proceeding from public meetings, and from the press generally,) are expressive of indignation at the movements of the abolitionists, and of determination to resist, *at all hazards, and to any length*, the practical execution of their theories, (even in the slightest particulars,) they command our entire and hearty approbation. But we greatly doubt the propriety and the policy of attaching much importance to the ravings of the abolitionists, and to their circulation through the press and the mails. The violence of effort openly exhibited in endeavoring to suppress these publications (even if entirely successful in the attempt,) may have as ill effects on those for whom these publications were designed, as their circulation: and perhaps worse may be there by increasing the apparent importance of the writers, and possibly their influence and power, far more than their own labors could as yet have effected.

We do not intend to discuss the question of right, or policy of the institution of slavery as it exists in these states. We should disdain maintaining the argument to defend our rights, or to urge our claim of property. Whatever may be the evils of our system of slavery, (and we deny not that they are many for the slave—and still more for their masters,) the matter is *our own concern*—and we will not consent to its regulation being touched by the people of the north. And while they will confine their efforts to mere *words*, they will meet with no success in exciting the slaves (of Virginia at least) as a body, to insurrection. There would be at least as much prospect of success, if the attempt was made, by writing and printing on this side of the Atlantic, to stimulate the peasantry of Ireland, or even the better informed poor population of England, to cut the throats, and seize the property of the rich. But though the object of the abolitionists is altogether visionary and impracticable—and would be an object for derision and contempt, but for its probable accompaniment of horrors—still they *can*, and probably *will*, (if at all *countenanced by the better judging majority of their countrymen*,) produce effects of awful importance, and affecting deeply and permanently, the welfare of the people of the United States, and the permanency of their present general government. The utmost direct effect of the efforts of the northern provokers of insurrection, would be conspiracies of slaves, detected before maturity, as recently in Mississippi, and visited awfully, illegally, and without just discrimination, on the heads of black and white—of the innocent as well as the guilty—or partial massacres by the blacks, as in Virginia in 1831, which however atrocious, and afflicting to individuals, would be nothing as a war measure, and would draw down most certain vengeance and destruction on the heads of the murderers. Whether such effects may be great or small, the sure and inevitable result must be, that whatever evils may be brought on the whites, will cause ten times as much to the race which the "philanthropists" are aiming or professing to serve. If any one desired the greatest possible amount of misery to be inflicted on the slaves of the south, by any means, and without regard to other consequences, he ought to wish for the increase of the numbers, strength, and power of the abolitionists of the north.

The Southampton massacre is often brought forward as proof of the impending danger of insurrection. To our understanding of those deplorable events, and the consequences, (and we had good means of knowing them,) they prove directly the contrary. The insurrection of Southampton was gotten up and sustained through the brief course of thirty-six hours, by the concurrence of several circumstances, some of which are so rare that they never can be again looked for. The leader was a man of uncommon power of mind, yet touched with something of insanity—a religious enthusiast, who had persuaded himself, and some of his ignorant followers, that he possessed prophetic, and perhaps other supernatural gifts. While this delusion (and the disease,) served to gain him his first few followers, he had cunning enough not to impart his design, even generally, but to two, until the day of the outbreak, and to but six or seven in all, before commencing the first and most murders on the sleeping and unsuspecting victims. If the secret had been committed to even fifty, and for a single week, there is no doubt but it would have been divulged, as in every other case of conspiracy. A powerful aid, also, to the most successful of insurrectionary movements in this country, was that it was the season for distilling; on every farm new brandy was found in abundance, and its maddening power was kept in full operation to gain recruits, and to stimulate them to acts of butchery. Their whole bloody progress manifested the deeds of men made frantic by the conflict of drunken valor and the cowardice of their nature, or of education. The band never reached fifty in number, and half the recruits were forced by threats into their ranks, and most of the others were deluded by false statements of their force and success, which were almost equal in power to actual constraint. They murdered fifty five persons, all surprised and defenceless, and mostly women and children, before their movements were enough known to cause resistance—and as soon as the least effective resistance by armed whites was made, the whole band broke and fled, scattered in dismay, and not the slightest attempt was made to rally, or repeat the effort. All the guilty perished—and unfortunately more than the guilty, from the madness of the times, such as will always be excited by such events—and of which awful fruits will always be produced, when an infuriated people (as lately in Mississippi,) take the execution of law and justice into their *own* hands—which is equivalent to having both law and justice completely put aside, and their place taken by the ignorance, delusion, and worst passions of men.

The efforts of the mad abolitionists of the north, (or of their more temperate countrymen, who claim to be friends of southern interests, because they are for at tacking slavery slowly and gradually,) may cause repetitions of such events, and their equally deplorable consequences: but they will only serve to destroy whatever amount of happiness and contentment is now enjoyed by our slaves, and produce to them misery, if not destruction, without there being a semblance of hope for effecting, by any of their efforts, the object of a peaceable extinction of slavery, and elevation of the condition of the blacks to equality of right and power with the whites.

It would be useless to remonstrate with the abolition societies and their leaders—to address ourselves to the reason of men who insanely expect to reach their objects through the desperate means which they use—or to appeal to the sense of rectitude of any, who, even for a desirable end, would willingly resort to means so abominable—so murderous in their tendency. But we would address our language of complaint and of warning, to the great majority of the citizens of the northern states—who declare themselves friends to the south, and utterly opposed to the schemes of the abolitionists—in the hope of inducing them to exert their counteracting influence, and to put down the nuisance—to use the power which the great body of any community on the right side must always have over a very small portion, considered by that majority as altogether in the wrong. We would ask of the reflecting, to say whether the movements of the abolition societies are likely to effect their avowed object, even if the object is thought desirable—and of the prudent and calculating, to consider whether any results disastrous to the interests of the south, would not also necessarily and greatly injure the interests of the north.

We are assured, from the north, as with one voice, that the abolitionists are but a few, scorned and contemned by the people generally, and by all of worth and high character. Still this despised handful of men, call and hold public meetings to disseminate their doctrines, in every town—have openly established, and keep in operation, presses to flood the south with incendiary publications—and instead of being put down by the force of what is said to be the public and general opinion, are permitted to proceed in their course without impediment of any kind. The reply is ready, that these acts, however detestable, are not in violation of existing laws, and therefore cannot be restrained. It is not for us to point out the remedy—but we beg leave to submit a similar case for illustration.

The people of the southern states are very generally opposed to the policy of forcing manufacturing, or other pursuits of industry, by protecting duties—by the operation of which, it is considered, that they and their country are heavily, unjustly, and illegally burdened, to furnish millions in indirect bounties, to northern capitalists. Very many of us in the south, upon general principles, as well as in regard to our general interests, are as hostile to this policy, as any calm and dispassionate abolitionists can be to the existence of negro slavery. Now suppose that a few thousand of our zealots—(for they are to be found in all parties and sects—) were to carry to such excess their hatred of this iniquitous policy of our government, as openly to league for its destruction, by inflicting loss and destruction on the interests and persons supported and enriched by protecting duties—that they provided materials and employed agents to burn the factories of the north, and to poison the proprietors and superintendents: that under a philanthropic horror of the enormous mass of suffering which is certain soon to reach, and then forever to attend the laboring manufacturers, (far worse than the sufferings of our negro slaves—) that all means of seduction were addressed to this class, including the plunder of their employers' property, to urge their joining in and becoming the most efficient agents of the work of destruction. Suppose that the preparation of means for these ends was carried on without disguise—that proselytes to the hellish design were continually and zealously sought by public meetings, and publications, in many southern towns—that the leaders and principal actors were all known, and even proud of their notoriety—and that nothing was hidden except the operations of their emissaries, attempted or executed in the northern states. Suppose farther, that with all this unlimited malignity of intention, the actual effects produced were comparatively trivial, and that the northern manufacturers, in fact, feared their enemies as little as slave holders have to dread the now avowed abolitionists: still—would such a state of things, and its evident increase, be patiently borne by the north, and the southern states be held as friendly? Would the plea be valid that "these villainous plotters were but a few, held in detestation and contempt by the great body of southern people, who would rejoice no less than their northern brethren, to see such miscreants meet with merited punishment, if the laws were such as to permit any to be inflicted: but that no existing laws had been violated by the known acts of these men in the south—and when they carried their proceedings to the northern states, it would be for the latter to apply the proper punishments—in the propriety of which, (and in aid of which, if necessary,) the south would heartily concur." If such declarations would serve to justify us in the opinions of our northern brethren, we ought to receive as equally entitled to respect the reasons given for the impunity and unmolested progress of the bold and open conspirators and incendiaries of the abolition school.

From the Arcana of Science.

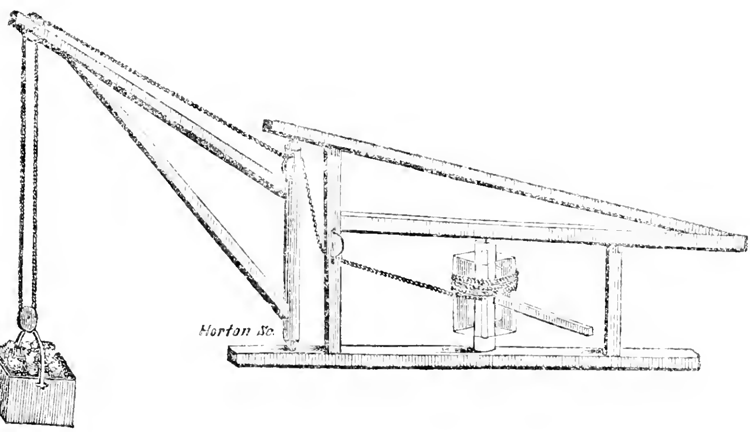
HOUSE FLIES.

On April 7, the Secretary of the Entomological Society read a paper by Mr. Spence, detailing a a curious mode, adopted in Italy, of excluding the house fly from houses. The plan consisted simply in straining a net, made of white thread, across the aperture of an open window: the meshes of the net were about half an inch in diameter. It had occured to Mr. Spence, whether it could be the dread of a spider's net which caused the flies to avoid the thread net, but on consideration he had determined otherwise; and he was totally at a loss how to account for so singular a circumstance.

For the Farmers' Register.

MACHINE FOR RAISING MARL.

In your Essay on Calcareous Manures, you give instructions for digging and carting marl. This method I pursued for several years, but found the labor hard on my hands, and tedious. Marl here is generally found in deep ravines, or in wet grounds. My operations have been slow, from the difficulty of making firm and lasting ways, and the labor of ascending steep hills. Last winter I made a model, and this spring I built a machine for raising marl, to be worked by a horse. I have been using it to advantage, and now send you a draught of it, as it may be useful to those who have wet marl pits like mine. By means of a pump to throw off the water, pits may be worked at a considerable depth; and even if marl is dry, if it lies deep, I think it may be used to advantage. I use two boxes, and by means of hinges and a latch, the marl is discharged from the bottom. I have double blocks: the rope passes through the swoop about eighteen inches from the end, and runs down to the post which supports the swoop, and passes through it, on a small roller, and in like manner through the next post, to the cylinder, to which a reel is attached to increase the motion. The post which holds the swoop and the cylinder, runs on iron pins let into thimbles. The lever is in two pieces, one fastened in the cylinder with a groove at the end, into which the other is let, and secured by a sliding iron clamp. When the marl is discharged from the box, and the swoop swung round over the pit, in nautical phrase, by unshipping the end of the lever, the rope unwinds, and the box descends without moving the horse. The circle in which the horse travels ought to be twenty-one feet in diameter, and the second and third posts supported by side braces.



The cost of the machine is small, though I cannot make an exact estimate. The carpenter who did the work, was hired by the day on the farm, and was taken off with other jobs: but his bill could not exceed eight dollars. The cost of the iron work was ten, and one hundred and sixty-five feet of inch rope, at eighteen and a half cents a pound. The timber, taken from my own woods, may be estimated at five dollars. The rope I find soon wears out, and I intend to supply its place with a light iron chain.

When the marl is uncovered, with one efficient hand in the pit, and a less efficient one to discharge the boxes and drive the horse, five hundred bushels may be raised in a day. The work is not oppressive to the laborers. The teams stand on high, dry ground: no sloughs to plunge through, and no hills to climb. The swoop is turned by a small rope over the carts, and the marl immediately discharged into them. I work four carts, with two sets of oxen to each. They came out of the winter lean and weak; and now with green clover for their food, at the distance of a half to three-quarters of a mile, I draw out from four to five hundred bushels a day; and my oxen have improved. My work goes on with ease and expedition, without stoppage to mend roads, or to clear ditches.

WILLIAM CARMICHAEL.

Wye, Queen Anne's co. Md. July 15, 1835.

CULTIVATION OF BEET-ROOT SUGAR IN FRANCE.

A hectare of land (nearly $2\frac{1}{2}$ acres) sown with beet, produces, in most cases, 2,400 kilogrammes of the root, which is equivalent to 47 cwt. 36 lbs. avoirdupois; and there are many instances in which a single grower raises from 80,000 to 90,000 kilogrammes (6,260 to 7,098 cwt.) The cultivation costs the farmer about 8s. the 1,000 kilogrammes (20 cwt.) The quantity of sugar extracted by the present process is in the proportion of seven or eight parts of saccharine matter out of 100 parts of the raw root. From the molasses, sugar is obtained, and the pulp furnishes nearly as much fattening food for cattle as the root in its simple state; the leaves also are much sought after by the grazier for his cows during those months of the year when green fodder is not easily obtained.—*Printing Machine, No.* 24.

From the Silk Culturist.

CLIMATE AND SOIL OF NEW ENGLAND.

Almost every newspaper in the country has an occasional paragraph on the culture of silk, and in many of them we notice the climate and soil of New England, spoken of as admirably adapted to rearing the silk worm and the cultivation of the mulberry. Remarks of this kind have a tendency, not only to make an erroneous impression but to mislead other sections of the country into a belief that there is something peculiar in our climate and soil, which gives us advantages and facilities, in this respect, not enjoyed by others, while, at the same time, precisely the reverse is true. That providence in the distribution of its gifts has given us a climate and soil congenial to the production of silk is a matter of fact, and ought to be of gratitude and thanksgiving; but that it has lavished them upon us in greater, or even equal profusion with some of our sister states is not true.

The middle, southern, and western states, have natural advantages for the culture of silk, which the northern can never enjoy. The white mulberry will grow luxuriantly in all parts of the United States, and so far as its foliage is depended upon for the subsistence of the worm, the natural advantages of all the states are equal. But with respect to the Chinese mulberry, it cannot be cultivated in the northern states, without much additional labor and expense; while at the south no extra care or precaution is indispensable to its propagation. This gives the southern section a decided advantage over the northern, which no amount of skill or experience, can counterbalance. The whole truth about it is, a portion of the population of New England, and especially of Connecticut, have been for about half a century engaged in the culture of silk, and their experience and observations have constituted a fund of practical information on the subject, which cannot be found in any other part of the country. The success of the silk business in Connecticut, is therefore attributable to this cause, and not to any peculiar adaptation of climate and soil, for in this respect we are far less favored than most of the other states.

From the New York Times.

CULTIVATION OF SILK.

It is little more than fifty years ago, since an American vessel was seized at Liverpool for having on board eight bales of cotton, it not being believed that the article could be produced in this country. At present about 600,000 bales are carried to the same port. To the culture of this article the country owes a great part of its wealth and prosperity. Where fifty years ago eight bales of cotton were produced, one million two hundred thousand are now produced. If fifty years ago a man had ventured to predict that the article of cotton would become the grand staple of the country, and add millions upon millions to its wealth, he would have been laughed at as a madman. It has lately been predicted that before many years are passed, the production of silk in this country will equal the production of cotton; and we see no reason to question the justice of the calculation. The cultivation of this article has been commenced by the enterprising men of the east. The soil and climate of New England are admirably adapted to its cultivation. Those who have thus far engaged in it, have reaped good profits, and have every reason to persevere. It has commenced in a part of the country where thrift and industry have never failed to succeed. It has been commenced under far more favorable circumstances than those which attended the first cultivation of cotton. It requires but little labor, and the principal part of the labor required may be performed by females and children. The experiment has thus far proved successful, and it has been attended with but a trifling degree of expense.

A MODE OF DESTROYING ANTS.

A writer by the name of Roughly, says: "Poisoning with arsenic is the most expedient mode of getting rid of ants, as the living will feed on the dead, so that the whole nest, (by devouring one another) are thus killed."

From the Northampton Courier.

PLOUGHING UNDER GREEN CROPS FOR MANURE.

Being the owner of a small farm, most of which was in a low state of cultivation at the time I commenced making experiments, and feeling desirous of enriching it faster than I could with stable and barn yard manure, the quantity made being small I therefore resolved to try the effect of ploughing under green crops. The piece upon which I tried my experiment contains nearly four acres, and is of a hazle-nut colored loam, lying near the Connecticut river.

In 1831, the lot above mentioned had wheat and rye reaped from it; about $1\frac{3}{4}$ were of wheat, and produced 17 bushels, yielding $9\frac{5}{7}$ bushels to the acre. The $2\frac{1}{4}$ acres of rye yielded about 27 bushels being 12 bushels to the acre—total of wheat and rye, 44 bushels. The ground for the wheat was ploughed three times and had the same number of harrowings. That for rye was ploughed but twice, with two harrowings; clover and herdsgrass were sown on the whole piece. At the time of raising the grain, I did not intend trying any experiment; but the grass seed not having come up well, the lot was ploughed once in August, 1832, and sown with rye, was fed down with sheep in the fall and also in the spring, until about May; thus affording sufficient feed to pay the expense of the seed for the first crop.

After the sheep were taken from the grain, it was left to grow until about the time it blossomed, when it was ploughed under, and the ground sown with buckwheat—$\frac{1}{2}$ bushel of seed to the acre. When the buckwheat was in blossom, that was also ploughed under; after which the ground was suffered to remain until a short time before it was sown, when it was again ploughed once, sown with wheat and rye, October 3d. Previous to sowing the wheat, the seed was soaked about twenty-four hours in brine, and afterwards rolled in plaster, where it remained in a body twelve or sixteen hours. My object in treating it in this manner was to prevent smut, and the ravages of the Hessian fly, which has several times destroyed some of my wheat; but fortunately the crops the present year were uninjured by them. The rye was sown in its natural state.

In the spring of 1834 the whole piece was plastered with about two bushels to the acre. It was sown for the purpose of benefiting the young grass, and it has now (spring of 1835) come up well, and bids fair to produce nearly twice the quantity of feed usually obtained from it in a season. The quantity of grain which the piece produced the past season is as follows: About one acre was sown with white flint wheat and yielded 16 bushels—2¾ acres were sowed with red bearded wheat, and produced 33 bushels, making in all 49 bushels or 14½ to the acre—⅝ of an acre was sown with rye and yielded about twelve bushels, being at the rate of 19½ bushels to the acre. The increase of the wheat crop, according to the above estimate, was more than 49 per cent. and that of the rye more than 59 per cent. Had the past season been favorable for wheat crops, I doubt not that I should have obtained eight or ten bushels more. Perhaps some may think the plaster caused the last crop to be better than the preceding one; but I do not think it was, as I sowed some on a piece of rye the past season, a part of which was left unplastered, and it could not be discovered that the plaster benefited either rye or land—the soil was the same as that on which the wheat was sown.

From the [British] Quarterly Journal of Agriculture.

IMPORTATION OF THE BONES OF CETACEOUS ANIMALS FROM THE POLAR SEAS FOR THE PURPOSES OF MANURE.

The great consumption of bones occasioned by the increasing demand for bone-manure in the extension of turnip husbandry to the more remote and inaccessible parts of the country, accompanied with the small indeed, but gradual, rise in the price of that valuable means of fertilizing the soil situate at a distance from large towns, naturally creates the apprehension that at no distant period the demand will outrun the supply. In order to anticipate such an "untoward event," our thoughts have lately been turned to a prolific source of supply which has hitherto been almost entirely overlooked—we mean the Polar Seas. Much valuable bone might be brought home in the whale ships from those regions. One large whale might afford several tons of bones. We are quite aware that while the prospect of an abundant supply of blubber arrests the attention of the whale-fisher, he will be regardless of the bones of the animal. This state of the mind is natural. The fisherman, when so actuated, only fulfils the principal object of his voyage, and were he always certain of loading his ship with the most valuable part of the cetaceous animals which he captures, no one should be so unreasonable as to request him to direct his attention in the short time he has to accomplish his object to any other subject. But we all know how very seldom whalers bring home bumper ships, how much more frequently the ships are only half loaded; while every year some come home clean. Now some of their time might be profitably, at least usefully, employed in securing a quantity of the bones, such as the jaws, ribs, and vertebræ of the animals which they capture, and although it would not be desirable to occupy the most convenient parts of the ship with bones, while there was a prospect of obtaining blubber, it should be remembered that no bones can be obtained without in the first place securing the blubber. It will, no doubt, not unfrequently happen that the most successful periods of the fishing, are those when the capture of whales takes place faster than the blubber can be removed from the carcass and stored by; and we have heard a whaler assert that they have had fourteen carcasses floating alongside awaiting the process of fleecing. But if the whole bodies can be kept floating alongside to await the convenience of the crew to remove the blubber, cannot the fleeced bodies in like manner be kept floating till it is convenient to disengage some of the bones? Bones are easily disengaged, and would be of easy stowage. They could be cut into junks with cross-cut staws made for the purpose, and many of them used as wedges to secure the butts in the hold, while others could be stowed away in any space in which a butt cannot be stowed. In this manner any ship could bring home many tons of bones; and it might be an understanding among the masters of the ships on the fishing ground, that if one ship was much taken up with the storing of blubber, while another was less successful, the latter might get leave to tow away the fleeced carcasses to their own ship. We have heard it stated that the bringing home of bones would be a question of freight with the owners of the ships. We think this is a mistake, for the mode in which whale-fishers are paid has no reference to freight. They are paid according to the tons of blubber which they bring home. Some bones have been brought home of late years; one ship from Leith last season we saw brought four or five tons; but what is that trifling quantity compared to what she might have brought when she came home little more than half laden? The mode adopted by the owners for paying for bones, is to give the crew one-fourth of their value, so that the question of freight has nothing to do with the matter. We wish the owners of the whale ships from Scotland would seriously take this matter into consideration, and encourage their crews to stow as much bone as they conveniently can at their leisure. The value realized by the bone might not only pay the expenses of delivering the ship, but might even reimburse the owners for the loss of the bounty, over and above the value of the blubber in an average voyage. If a premium of a piece of plate from the Highland Society would be any stimulus to the captains who would bring home the greatest quantity of bones, and thus forward our views for the benefit of agriculture by a constant supply of a cheap and efficient manure, we are sure they will be happy to grant such a prize to the successful competitor, and the owners we are assured would be proud that it was one of their ships which had carried off the honored prize.

From the British Farmer's Magazine.

REMARKS ON THE SCARLET TREFOIL.

Addressed to the Conductor of the Gardener's Magazine, and communicated by MR. LOUDON.

As the scarlet trefoil (*trifolium incarnatum*) has already engaged the attention of agriculturists, and from its valuable properties is likely to be brought into general use, permit me through the medium of your periodical, to offer a few observations on the best mode of cultivating it.

It is well known, that all the clovers like a solid bottom; and from experience it appears that such is more particularly the case with the scarlet trefoil. When the land upon which it has been sown has been rendered fine and light, by repeated ploughings, the crop has frequently been an entire failure. Such failures have been attributed to the depredations of grubs; but there is much reason to believe that, the plant perished in the winter, owing to the lightness of the soil, as I have never heard of a single instance of failure when the seed was committed to an unploughed surface. In the beginning of October, 1833, I sowed a plot of garden ground, the soil being strong and rich, upon a chalk bottom. The seedlings came up well: but, in the course of the winter, all perished, with the exception of a single plant. In September, of the same year; Colonel Beach sowed a few acres in a field, about a hundred yards distant, which he had ploughed and dressed for the purpose, the soil in this case being of a similar nature to that mentioned above, and here again the crop was a failure. At a distance of about two hundred yards, and upon soil precisely similar, and in the same season, a stiff, unploughed wheat stubble produced as fine a crop as could be desired. The farmer, who had this crop, had previously pursued the same plan, and had realized from his produce upwards of £40 per acre! I find, also, that the crops have frequently failed in the county of Essex, where the ground had been ploughed before sowing. In September last, I sowed four and a half acres upon a barley stubble, without any preparation whatever, and there is an abundant plant. I do not mean to assert positively that, no crop will follow after ploughing: but experience proves that success is very doubtful when this is done.

With respect to the properties of the trefoil, I do not believe that there is a more hearty green food in existence. Cattle are extremely fond of it. Farm horses, during their spring work, may be kept in the highest condition upon it, and after affording abundant feed, may be cleared off in time for turnips or barley, both of which, upon trial, have succeeded perfectly well after trefoil.

Should these observations prevent disappointment, or be the means of drawing the attention of the farming interests to the facts of the case, it will be satisfactory to their friend,

MATTHEW HARRISON.

Church Oakley,
Near Basingstoke, November, 1834.

P. S.—Scarifying the ground has been found to answer well; and where the surface is foul, it is certainly advantageous.

From the Claremont, N. H. Eagle.

SHEEP.

It is a well known fact, that wool growers in this section of the country, whose flocks exceed 200 sheep, lose a large number of their sheep each winter. Some of them, we will allow, die of old age; but too many of them do not live more than two years. There is a remedy for this loss of property and that too directly in the hands of the shepherd. This being the case I am anxious to lay it before the public that all may profit by it hereafter.

It is a custom among many farmers, when they drive in their flocks in the fall, to put the whole flock together in a single barn, shed, or whatever place they may happen to have to keep them in. Now it is very evident that the young, the very old, and weakly, or in other words, the most unhealthy of the flock, cannot possibly fare equally well with the rugged, and it is a fact while the one is thriving the other is losing its strength. When kept in this situation, one after another falls from hunger, and other causes incident to this state of affairs, and they are no longer able to raise themselves. Here the shepherd for the first time separates the almost lifeless sheep from the multitude, and endeavors to restore it to health. But it is too late. He is soon convinced that "a stitch in time saves nine"—that ten thousand dying sheep, are worth no more than the wool on their backs.

When sheep are brought in from the pastures, in the fall, they should be divided into four distinct flocks, viz.

1st. Meagre or sickly—which should be kept in a warm barn, with but few in a pen. They should have salt as often as once a week—should have a handful of corn each day through the winter—as much hay as they can eat through the day, and should be watered as often as twice a day. This will not fail to keep them in good order.

2d. The ewes also should be kept from the rest of the flock and should receive the same treatment with the exception of the green which may be given occasionally, though it is not necessary.

3d. The bucks, intended for the benefit of the flocks, should be kept by themselves, that they may be in good order, and for another reason that will suggest itself to all wool growers.

4th. And last of all are the wethers which may be, if healthy, kept entirely on hay and water.

I have for twelve years kept a large flock of sheep, and have lost a great many; but since 1830 I have adopted this course and have not lost one-tenth as many as I did in the same number of years preceding that time.

AN OLD FARMER.

From the Annales des Arts et Manufactures.

DURABLE WHITEWASH.

I am enabled to certify the efficacy of marine salt in fixing whitewash made of lime. In the year 1795, when I was director of the naval artillery at the port of Toulon, I was commissioned to ascertain the utility of a method proposed by the master painter of that port, M. Maquilan, for whitewashing the ships between deck, and likewise their holds, in a durable manner, by means of lime. Our report was in favor of this process, which consists in saturating water in which the lime is slacked with muriate of soda, (common salt.) The whitewash produced by it is very permanent, does not crack, nor come off upon one's hands or clothes. The experiment was made only on wood. It appears from M. St. Bernarde's account, that it succeeded equally well on walls.

THE PITCHER PLANT.

Few plants if we consider the structure of its foliage, are more interesting than the pitcher plant, of Southern India. It is found in Ceylon, Java, and other islands in the Indian Archipelago. It has been transplanted into several gardens in England, where it attains to great perfection. Its stem is eighteen or twenty feet. It branches out over the wires prepared to support it; and bears numerous leaves, in the form of a pitcher, and which look more like art than the production of nature. The leaf, including the stalk, is two feet long. The pitcher is rather an appendage to the leaf, than the leaf itself. It is hollowed out like an elongated pitcher; and is eight or nine inches long. It is attenuated at its base, where it is curved or arched, and then suddenly turns upwards. In its young state, it is covered by a lid or operculum. After a time, the lip opens, and the mouth of the pitcher is exposed to view. The color is pale green, but often tinged or spotted with red and purple.

From the Field Naturalist.

THE LLAMA OF PERU.

We are indebted to the attention of a correspondent in Oban for the following account of the interesting attempt now making in that neighborhood to domesticate the llama.

I am not surprised that the llamas here should be exciting attention, for they certainly are objects worthy of notice. This animal does not in any shape resemble the sheep of this country; its height is from four to five feet, with long legs and long neck, in some respects not unlike the camel, a small head without horns, the countenance gentle and expressive of wonder. It is not remarkable for any peculiar habits, except that it delights in ascending to the summits of the hills: its appearance indicates an unfitness for climbing: I observe, however, nature has served it with a hooked claw on each hoof, which enables it in some measure to travel heights with as much security as the goat. Their food and treatment differ in no particular from Mr. Stevenson's cows; they graze, eat hay, chopped straw and potatoes, with them daily, and have formed such an attachment to the cows, that when the latter are brought from the hill for the purpose of milking, the llamas will not remain behind, but accompany them to and from the byre three times a day, a distance of half a mile—the wool is extremely fine, each fleece weighing from five to six pounds. Mr. Stevenson imported the first pair (of the Alpacha breed, for there are several varieties,) about three years ago—he tells me that there were four or five pairs shipped for him, but all died during the voyage except the one, and the following year he received another pair of what he terms the real llama, but a common observer cannot descern any difference. They inhabit the mountains of the Andes, and, when domesticated, are used in that country as beasts of burden, chiefly in carrying ore from the mines of Peru, and they carry about 100 lbs., and if one pound be added more than they can carry with freedom, like the camel, nothing will impel them forward. If there was any chance of rearing them, they would doubtless become a benefit to the country, but I fear the hope of their breeding is very uncertain.

From the Arcana of Science.

SOLVENT OF INDIAN RUBBER.

There is no solvent of Indian rubber so good for gardening and most other purposes, as refined coal tar, sold under the name by drug merchants, which is only common coal tar deprived of water by boiling.

From the Southern Agriculturist.

ON THE PREPARATION OF VEGETABLE OILS.

The production of the fixed vegetable oils, has in all climates been a source of wealth; and of course has attracted the science, industry, and capital of cultivators. The plants in use are confined to no zone, though growing in greater variety and abundance, in tropical or hot countries.

We, too, have indulged in speculating upon the agricultural value to us, of oil plants. These speculations have been generally discursive, or directed to some individual of the class. The only methodical investigation of oil-bearing plants, known here or easily introduced, of which we have ever been informed, was undertaken by the late Mr. George Trescot, in whose education, the exact sciences preponderated so much, as to impress us with the belief, that his inquiries would be valuable for their order and precision, he had, as we learnt, in conversation, made considerable progress in his researches, but his untimely death, it is presumed, left them imperfect.

In the east, the plants cultivated for this use, are mustard, the fixed oil of which is as mild and bland, as the volatile oil is notoriously acrid; linseed, familiarly known every where. Sesamum and Palma Christi. This last has been successfully cultivated in all parts of South Carolina, the oil commanding a higher price in the market than any imported. The mode of extraction was generally by boiling. It has fallen into disuse, unable to compete with the profits of our cotton culture, and perhaps, in some degree, from the difficulty of the harvest: the seeds ripen successively, and are shed by the plant as they mature, the loss in this way bears heavily upon the whole crop. It is cultivated like Indian corn, but we are without any circumstantial estimate of the expense and profit of growing it. Many gentlemen resident near Beaufort could supply this estimate, and we hope to draw the attention of their agricultural associations to it.

The sun-flower seed is used in a limited degree in Europe, from the Spanish peninsula to Russia, and its cultivation has been earnestly recommended in the United States, where, in some instances, it has produced 60 or 70 bushels to the acre, the bushel yields three quarts of cold and one of hot pressed oil. Notwithstanding the plausibility of this account, we know of its growth only to feed poultry, and especially turkeys, which thrive upon the leaves and seeds, and, perhaps, it is used quite as much for the pleasure of its flaunting flowers, as for any profit which it brings.

At Arras, and other places in France, extensive tracts are covered with poppies, which adorn hill and dale with their rich variety of bloom. These are intended to produce seed only, and large mills are erected to crush and press the oil from the seed. When first pressed the oil is colorless and insipid, and the avowed object is to adulterate with it, the more costly olive oil. The same cultivation prevails in Flanders.

All plants producing oil exhaust the fertility of countries in which they are extensively grown, and in fact, they will grow thriftily only in the richest soils. At the mention of exhausting plants, the memory of every reader promptly recalls the cotton, now about to derive from its seed a new recommendation.

A mill for preparing the cotton-seed oil, was erected at Petersburg, in Virginia, several years ago, by Follet & Smith, patentees of that part of the apparatus intended to hull the seed. This process was considered indispensable, and the owners of the patent-right set upon it so high a value, as to deter from the general adoption of it. A small establishment on their plan was made in North Carolina, and General D. R. Williams, of Society Hill, in South Carolina, is believed to have erected a mill after Mr. Smith's plans: we should be glad to hear the results from our friends in that quarter. In order to bring their mill into prominent notice, Messrs. Follet & Smith obtained from our legislature an act of incorporation for a Joint Stock Company, to hull cotton-seed and press oil, but the project has not excited attention, and seems likely to rest in the hands of the patentees.

Launcelot Johnson, of Georgia, invented an instrument for hulling cotton-seed, which he describes as a truncated cone, furnished with teeth, which revolves in a tub adapted to its form, and also furnished with teeth; the two sets of teeth pass near each other and tear off the hull, this is separated by a sieve and fan from the kernels, and the kernels are pressed. One thousand pounds of upland cotton will produce twenty-five bushels of seed; three bushels of seed produce one of kernels, and one of kernels produce two gallons of oil, or one and a half to two bushels of seed, will produce one gallon of oil. This contrivance has not been patented, but on the contrary, the most liberal offers of its use extended through the public prints, with the earnest recommendations of the Hon. Mr. Clayton of Georgia. It has the appearance of a cheap, easily managed, but imperfect engine, and other means supposed to be more efficacious have been adopted.

Individuals in New York are known to use methods of expressing and purifying cotton-seed oil. And the Messrs. Freemans, of Philadelphia, extract the oil without hulling, and clarify it very perfectly; their methods are, we believe, secrets of trade.

Messrs. Plummer & Miller erected in 1833, a very extensive mill at Natchez, moved by a powerful steam engine, and brought to this enterprise all that capital and organized labor can provide for its perfection, their mill has been in profitable operation ever since, and they have secured the most perfect means of purifying their oil. We learn from a traveller, that they have been joined by James H. Couper, Esq. of the Alatamaha, and to those associates, an act of incorporation was granted during the last year, for half a million capital, the establishment at Natchez, being rated at $100,000 in stock. Steamboats ply up the Mississippi, and its tributaries for the collection of seed, the rank fertility of the soil makes this of no value as manure; and it is obtained in part, at least, for the labor of its removal. Branches of the Natches' mill, have been and will be extended through that country.

Mr. John Couper, jun. of Georgia, is the proprietor of a mill of considerable extent at Mobile. His oil when purified by processes, lately introduced, sells there at 90 to 120 cents a gallon.

Cotton-seed oil is consumed, *in painting;* in this use, its character is that of an oil drying very slowly—more slowly than linseed-oil, and unless purified, darker in color; in *burning*, in this, it produces no effluvia and little smoke; in *manufacturing woollen cloths*, in this, its value seems yet uncertain, indeed, very doubtful. For *machinery*, where we should suspect it of too great a tendency to become inspissated, though they say not; and in *adulterating* castor oil, for which it is recommended as a mild substitute.

The meal or oil cake has great value in feeding stock, even hogs partaking of it without injury, the removal of part of the oil, and perhaps, the hull render it more digestible than before. Negroes employed about the mills frequently mix it with their corn-meal as a savoury ingredient; and we have been assured by an eye witness, that it is a decided improvement.

It does seem strange that this state should be the most tardy in turning to account a very valuable product. At length, however, if we are not misinformed, one of our skilful and wealthy planters, is about to embark in the business of pressing and purifying cotton-seed oil here at home.

We solicit from our distant readers intelligence upon this subject.

CONDUCTOR.

From the Arcana of Science and Art, for 1835.

AFFECTION AND VAST NUMBER OF FISHES.

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But affection is scarcely to be looked for where the offspring is so very numerous as to put all attempts at even recognising them out of the question. How could the fondest mother love 100,000 little ones at once? Yet this number is far exceeded by some of the matrons of the deep. Petit found 300,000 in a single carp; Leuwenhoeck, 9,000,000 in a single cod; Mr. Harmer found, in a sole, 100,000; in a tench, 300,000; in a mackerel, 500,000; and in a flounder, 1,357,000. M. Rousseau disburthened a pike of 160,000, and a sturgeon of 1,567,000; while from one of this latter class, some other person (whose name we do not immediately recollect,) got 119 pounds weight of eggs, which, at the rate of seven to a grain, would give a total amount of 7,653,200 eggs! If all these came to maturity, the world would be, in a short time, nothing but fish; means, however, amply sufficient to keep down this unwelcome superabundance, have been provided. Fish themselves, men, birds, other marine animals, to say nothing of the dispersions produced by storms and currents, the destruction consequent on their being thrown on the beech and left there to dry up, all combine to diminish this excessive supply over demand. Yet, on the other hand (so wonderfully are all the contrivances of nature harmonized and balanced,) one of these apparent modes of destruction becomes an actual means of extending the species. The eggs of the pike, the barbel, and many other fish, says M. Virey, are rendered indigestible by an acrid oil which they contain, and in consequence of which they are passed in the same condition as they were swallowed, the result of which is, that being taken in by ducks, grebes, or other water fowl, they are thus transported to situations, such as inland lakes, which, otherwise, they could never have attained; and in this way only can we account for the fact, now well ascertained, that several lakes in the Alps, formed by the thawing of the glaciers, are now abundantly stocked with excellent fish.

A METHOD FOR THE DESTRUCTION OF THE CUT WORM.

To the Editor of the Farmers' Register.

Ben Lomond, Aug. 3, 1835.

It is doubtless a subject of interest to the farmer to be informed on any subject relating to his advantage; and as your periodical has for its object the improvement of agriculture in all its branches, I willingly contribute my *quota*, hoping that what I may say, may serve in a measure to aid that object.

There was a field brought into cultivation this spring which had not been cultivated for several years. The crop planted was corn. The corn sprang up, and had begun to grow "pretty considerably," when on examination a few days after, it was discovered that most of the corn was entirely destroyed by the cut worm. Corn was again planted, and still the same case continued, until in that field the corn was (I may say) planted entirely three times. By accident, however, a small portion of the grass had been burnt—and on examination it was observed that a very small portion of the crop required "*re-planting*," (as the farmers say,) from that cause, viz: cut worm. In this case the cut worm was destroyed, doubtless by the fire, as it was destructive to all parts of the field, except the part burnt. Then, if you should be troubled, or rather expect trouble from the cut worm, if you will burn the grass on your lands, I think I can safely guarantee to you, that the destruction of the worm will be sure.

If any of your readers are willing to profit from the experience of others, let them when necessity requires, try the remedy, and effect the cure.

F. B. WATKINS.

SCARLET TREFOIL. SPECULATIONS ON THE PECULIAR BENEFITS TO WHEAT OF A PRECEDING CROP OF CLOVER.

[The following extract is from a late English pamphlet entitled *Further observations on the cultivation of Scarlet Trefoil, &c.* The facts stated are interesting and important—and though the reasoning is far from satisfactory, it may furnish subject for thought and more successful deductions, on an important and mysterious breach of husbandry, viz. the growth of wheat after clover, and the peculiar benefits furnished by the latter as a preceding crop.]

Now turn to the scarlet trefoil;—whether cut green for the horses or cut for stover, it may be clear from the land the first or second week in June; then the first time the plough goes into the earth it turns up like the finest garden mould, it is like ploughing an ash heap, or diving into a barrel of flour. In the same field, one part of the land is all powder, with only one ploughing, before the harrows have even touched it: and by or before the first of August it will be in a better state than the fallow, where the farmer has been rending and tearing to pieces his implements of husbandry, and wearing his horses to skeletons. The benefit will not end here, for where the scarlet trefoil has grown, the succession crops will be better than on the fallow; I have invariably seen it.

It is impossible to know and contemplate these circumstances without being led into further reflections upon them; in hinting at causes that may produce these effects, it is solely done to ask for information, trusting that this pamphlet may stray into the hands of the scientific, as well as the agriculturist.

When we consider the living wonders contained in a drop of water, which the microscope has lately brought to view, have we not reason to suppose that a grain of earth may be equally teeming with animal life; and when sheltered and protected from the sun's scorching rays by the scarlet trefoil, may they not have produced the effects I have mentioned, and which absolutely hold up the boasted arts and labor of man to derision?

It is well known to every farmer, that when he has a field of clover, part of which shall be a perfect full plant, and part without a leaf upon it, and this last shall be kept free from weeds the whole summer, the other part mown twice, and all the produce carried off the land and nothing returned, yet where this land has been thus robbed without rest or manure, the farmer well knows that the following year this very land will produce him from seven to eight sacks of wheat per acre, and the part that has had perfect rest will not produce three.* Ask a farmer the cause of this, and he will tell you because the earth has been exhausted by the sun: ask, exhausted of what? and after being posed for a time, he will say—moisture: the farmer may be right; I think exhausted of animal life. The farmer well knows if this land is broken up by the plough—the harrows and rolls set to work upon until it is reduced to powder, the moisture will be still further exhausted, yet it will be equally fertile with the other for his crops in due season.

Have not agents, unseen, been doing this work beneath the shelter of the clover, which the farmer knows he must do with his ploughs and teams, to make his land productive? I could mention numerous other circumstances which appear to point the same way.

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* The first part of this sentence is either written or printed very incorrectly, but the intended meaning is easily gathered from the remainder of the passage. The author evidently designed to compare the results of wheat on clover lay (though after mowing,) which in this country is called "fallow," with the very different preparation for wheat called "fallow" in England.—ED. FAR. REG.

There is a phenomenon frequently occurring in our fine autumnal days, which creates a moment of pleasure and surprise to the traveller. In less than two hours after the plough has turned up the furrows of a field, it will be completely covered, as if a sheet of gauze or lawn had been cast over: this is known to be the work of countless millions of a small species of spider, which are never seen till the plough turns them up to the light. We cannot believe that the Almighty Creator of the universe can have formed these little artizans, solely that the mind of man may receive a moment's pleasure from viewing their floating gossamer.

The information I seek comes, as a question, into a small compass: To what extent animal life exists in the earth, and how far vegetation depends upon it?

From the Southern Agriculturist.

THE FIG, (*Ficus Carica.*)

A native of Caria, in Asia, whence its name: known in the warm climates of Europe and Asia: in its wild state bearing fruit; perfect in the developement of the parts of fructification, but without flavor; those in which the stamens are most conspicuous are apt to fall before maturity, and are used to impregnate and accelerate the ripening of cultivated figs. The practice is said to prevail under the name of caprification, and has given rise to the controversies among travellers in the Levant. The only inaccuracy fairly chargeable upon those who assert the existence of the custom, is perhaps, an affected exactness in the details described: and some extravagance in the results attributed to it. The practice occupied more attention than its importance would seem to have warranted, and has now become a mere matter of curiosity.

Other modes of forcing the fruit to maturity are said to have consisted in punching the fruit at the flower end, or inserting in that end a drop of oil.

This use of oil has been made familiar to us by experiments at home; in our 4th volume, page 224, the use of olive oil or hog's lard in Florida, is described as ripening green and hard figs in seven or eight days, several weeks in anticipation of the regular period of maturity. At page 388, several members of our Horticultural Society concur in stating that applied to the flower ends of fruit from 1 to 1½ inches in diameter, ripens them fourteen days earlier; that oiling the whole fig was injurious; and that the use of oil to those less than one inch in diameter, caused them to fall off, without coming to maturity. At page 473, a drop of oil was applied to the centre of the flower end of the fruit, in less than 24 hours the fruit began to swell and matured a fortnight earlier than those without oil. At page 534, there is reason to believe that the limit to a beneficial use of oil, is in anticipating by seven or eight days the usual time of ripening. The fruit touched at an earlier growth either fell off or was insipid, olive oil or sunflower oil were found effective, tallow and lard ineffective; the trial was extended to both black and lemon figs. At page 582, its mode of operation is discussed, which seems to be by arresting the growth of the part touched, and giving to other portions of the fruit extraordinary stimulus.

We delight in this fruit, and remind our friends of the results recorded as an introduction to what we now propose.

Although one or two doubtful cases have been mentioned to us of the growth of seedling trees here, we think ourselves safe in saying, that no other mode of propagation is known to us, but by cuttings, layers, or suckers.

Many varieties are cultivated here, and of each variety, there are great differences observable in the quality of fruit from individual trees. We propose that every person possessed of a peculiarly fine tree, should take note of its production, and enable us to record a description of the tree and its locality, with a view to the extension of its culture.

The storm of 1822 blew down a tree so large, that it could not be replaced without cutting off its branches; these were trimmed very short, and the tree erected, put forth a vigorous growth of wood. The next year the fruit was so much larger and richer in flavor, as to induce this resolution, of three trees, to cut one close each year, and thus secure a constant supply of fruit from young wood upon large stems; the suggestion is thrown out with the hope of provoking trials to be communicated to us hereafter. The three following sorts are not known to us, and if they exist here, we should be glad to hear of them.

Large white Genoa, fruit large, pale yellow without, red within.

Brown Turkey, large, reddish brown.

Black Genoa fig, fruit purple, almost black, large at the flower end, becoming slender at the stalk, downy and colored like a rich plum.

In the garden of Mrs. Wagner, St. Philip's-street, there existed last year, a very fine tree, suspected to be a brown turkey fig, we hope to hear that it escaped the frost, and recommend it to our readers.

Our people are not sensible of the value of this luxury, or of our peculiar advantages in its cultivation. The following passage will enable them to compare the ease with which we produce this salutary and abundant fruit, with the pains taking of French gardeners.

"The inhabitants of Argenteuil, near Paris, derive their chief support from the culture of fig trees; near that town are immense fields covered with these trees, on the sides of hills facing the south, and in other places sheltered from the north, and the north-west winds.

"In the autumn, the earth about the roots of these trees is stirred and dug; as soon as the frosts commence, the gardeners bend down the branches, and bury them under six inches of mould, which is sufficient to preserve them from being frozen.

"The branches must be entirely stript of their leaves before this is done; the gardener then taking hold of the top of each branch, bends it down gradually, and with much care, to prevent its breaking, placing his knee or hand under such parts as resists the most; the branches that will not bend low enough to be buried, are cut off close to the ground.

A fig tree will remain buried in this manner seventy-five or eighty days without harm; when the season is mild, the gardeners uncover them, especially in times of warm rains, but on the first symptoms of frost they are again buried. Severe frosts sometimes reach them, but the branches only are destroyed. The roots produce a new crop in the summer; but these do not bear fruit till the next year, and are more tender and liable to be killed by frost during the next winter, than older and more woody branches.

"In the spring, the trees are carefully inspected, and where a double bud is observed, the gardeners, who are able to distinguish a leaf-bud, which is more sharp, from a fruit-bud, which is rounder, pinch out the leaf-buds, without hurting the fruit-buds; these, as they receive the sap prepared by the plant for two purposes, produced fruit of double the ordinary size: this is done at Paris between the first and tenth of June: but these leaf-buds may be suffered to expand a little, till they can be distinguished with certainty: they must not all be destroyed at the same time. In cold seasons, the ripening of the fruit is hastened by inserting a drop of oil in the eye, from the point of a pen or tooth-pick.

"It is necessary in dry seasons to water fig-trees: the nature of the plant requires to have its roots cool, while its head is exposed to the hottest sun. If planted against the south wall of a house near a spout that brings water from the roof, it thrives luxuriantly. Figs do well also in a paved court: the stones keep the ground under them moist and cool, while the surrounding buildings reflect and increase the heat of the sun's rays."

From the Genesee Farmer.

LATE MOWED HAY.

The editor of the Western Farmer has objected to our recommendation of mowing after harvest. We hope he may be enabled hereafter to make more accurate observations.

In our youthful days, it was the practice to mow the natural grasses as soon as might be after they came into bloom. The hay was of a beautiful green; and all persons, as far as we knew, thought it must of course, be the best. About twenty-five years ago, our attention was first turned to the subject. Farmers in this quarter, cut their grass at such times as were most convenient; that is to say, a part was generally cut before harvest; but the principal part, owing to the pressure of other business, was cut after the grain was secured; and the same motives of convenience induced us to adopt the same practice. We found however, by repeated observations, that our live stock, whenever they had the liberty of choosing, rejected the green hay, and preferred that which had been well matured, although of a rusty appearance.

Having clearly ascertained the fact we inquired of some of our most intelligent farmers who were also acquainted with the value of well ripened hay, what was the cause of this preference? and the purport of the answer we received, was as follows: "Grass cut before it is matured, contains little or no saccharine matter; the juices turn sour, like wine that is made of crude or watery grapes; and the sense of taste in chewing two stalks of two kinds can distinguish them at once—the one being much more sweet and pleasant than the other."

The notion that plants are always nutritious in proportion to their quantity of soluble matter, is erroneous. The quality of that matter, is of more consequence. Sugar is supposed to be more nutritive than any other substance; and no plant has yet been discovered that produces it in such quantities as the sugar cane. This is one of the natural grasses; and it is only cut when the plant is mature. Indian corn is also one of the natural grasses, and its stalks yield much saccharine matter. In the revolutionary war when our intercourse with the West Indies was interrupted, many families were supplied with molasses obtained from this plant, but the stalk was always used when it was well ripened.

The leaves of the cane are entirely rejected in the manufacture, as the sugar is not deposited in any part except the pith: and the last remark will apply to plants of Indian corn. Sugar is also obtained from the pith of the Bamboo, another of the natural grasses. We mention these things to show by analogy that the dried leaves of timothy may be of little value, and the deterioration, if any, is not then to be imputed wholly to the increase of saccharine matter in the stalks.

We are not prepared to say that the artificial grasses yield sugar in any valuable quantities; or that the plants should be well ripened before they are cut for hay. At present we rather incline to the opinion that a distinction in this respect ought to be made between the two natural orders: and that the latter may not be improved by standing very late in the season.

From the New York American.

COOKING BY GAS.

This new application of gas seems to us of great promise, for economy, comfort and safety. We had heard nothing of it until a few evenings since, on the invitation of Mr. *J. [illegible]*, president of the Manhattan Gas Works, we had an opportunity at his house, both of seeing the process in operation, and verifying the fact that what was there cooked, was "well done," even though not "quickly done".

The apparatus is of great simplicity. A circular or eliptical burner of such dimensions as may be needed—in a large family several of different dimensions would be required—is constructed, pierced with numerous and very small apertures, so that all the gas that passes may certainly be consumed. In the centre of the circle, is a permanent perpendicular spit, on which the joint to be roasted is impaled, a sheet iron funnel-shaped chimney, large enough at the bottom to include the lights, and tapering upwards so as to concentrate and reflect the heat, is then placed over the whole, and the cook may go about any other business, for the next two or three hours, fully assured on coming back at the end of that time, of finding the meat well cooked. But this is not all. Over the funnel-shaped chimney is placed a large tin vessel divided horizontally into two compartments—the lower one serving as a kettle to boil water, the upper as a vessel in which to boil meats or vegetables, and the same fire and the same time required for roasting, will also suffice for boiling the water, and cooking the vegetables. The cost for fuel of such a fire, as we saw, by which a 12lb piece of beef was roasting, was stated by the superintendent, Mr. *Barlow*, at two cents an hour—or six cents for the whole period for cooking dinner—add to this the further economical advantage, that you only light your fire when you want it, and extinguish it the moment it has fulfilled its purpose, and we have a strong argument on the score of cheapness.

It is obvious that any number of these burners may be arranged—all to be supplied by one main leader—and as the cost of these fixtures is small, and only the gas actually used is paid for, it would be expedient always to have several of them.

Of course the value of this new application of gas depends upon proper care in the use of the apparatus, and on the part of the company, in the preparation and purification of the gas. As to the first, the whole thing is so simple, that except through wilfulness there could be no mistake, and as to the purification of the gas, the interest of the company would be so great in seeing to that, as upon its fredom from smell and brightness in burning, its general use would essentially depend—that little need be apprehended on that score.

Upon the whole we confess ourselves amazingly taken with this kind of fuel—and recommend to our friends to ascertain, at the works of the Manhattan Gas Company, the cost, and the advantages particularly in hot weather, of such kitchen fires.

For the Farmers' Register.

ON DRAINING, AND RECLAIMING LANDS, SUBJECT TO INUNDATION FROM FRESHETS, BY DIVERTING, AND STRAIGHTENING THE BEDS OF STREAMS.

The figure in view, exhibits a body of creek low grounds, drained and reclaimed from freshets, in which

A F C D E represents the channel of the creek.

A F C the part of the old channel to be changed.

A B C the new channel, cut through the middle of the low grounds.

G H I J K L M, a margin ditch on the border of the first low grounds.

S, S, S, S, &c. ponds, drained in different parts of the low grounds.

t, t, t, &c. little ditches, many of which rendered useless by the main drain.

O P Q R, a conductor at the foot of the hill, at the border of the second low grounds.

T U V W X Y, outlets from the conductor into the margin ditch.

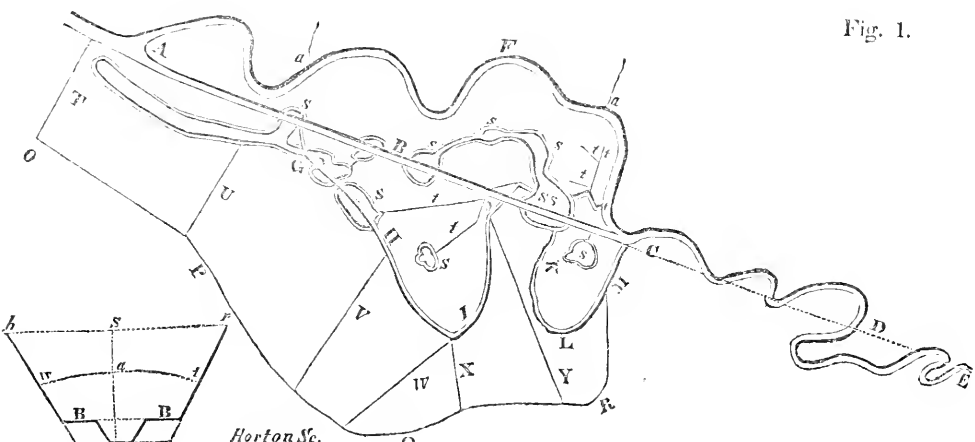

Fig. 1.

Fig. 2.

Having explained the general features of the figure, the remarks which accompany it we shall briefly arrange under three heads.

1*st*. The *condition* of the land exhibited in the above figure, before drained and reclaimed.

2*nd*. The method adopted to effect it. And

3*rd*. The effects produced afterwards, and the advantages derived to the land, from the whole operation.

First then in regard to the *condition* of the land. It was very subject to *inundation*, so that in extraordinary freshets, the low grounds was for the most part covered with water. Secondly, it was in many places excessively wet, being constantly saturated, and often supersaturated with water, oozing out and coming down from the adjacent hills: for the flat being so wide and level, there was no way of getting rid of it except by evaporation. Thirdly, it was subject to continual washings and scourings, occasioned by the stream cutting across the bends of the channel; which washed and gullied places being abandoned, became stagnant ponds that grew up in bushes, and offered a safe retreat for the nursery of black birds, that are more destructive to the young corn than even the freshet itself. Fourthly, the land was inconveniently intersected with a number of small ditches, the birth-place of bushes, and obstacles to the plough. Fifthly, the land was frequently worked out of season, from being too wet at the proper season. Sixthly, it was liable to be worked wet, and when so, the invariable consequence was, a diminution of the crop; impoverishment of the land; increase of draught on the horse; and the land was cloddy all that season. Seventhly, the land was so wide and level, that there were few outlets for the superfluous water, except the old channel: and that frequently at so great a distance, that the ditches necessary to conduct it off were too long, and of course liable to fill up, and too expensive to cut. Eighthly, pasturing the land in this condition was extremely detrimental, and it must be pastured so, or not at all, frequently. The pasturing of lands in wet weather, especially in long rainy spells, must be very injurious to them, especially arable lands. Cattle, it appears to me, should be kept up during such spells. Lastly, the low grounds were disfigured, with many undrained ponds, sunken places, &c., the effluvia of which, is generally unfriendly to health; though I have never suffered from this cause, the ponds being of small extent. Such was the condition of the land, which leads us to consider

Secondly—The method adopted to drain and reclaim it from inundation.

To do this, I diverted the part of the stream A E C, from its ancient bed, through the heart (or belly rather, of the low grounds, as it now answers the purpose of a main gut, or as physicians would say, the alimentary canal) into a new channel A B C, ten feet wide, and on an average of four and a half or five feet deep, and about three quarters of a mile long. This depth however, was found insufficient; and then I had a small ditch excavated, in the middle of the bottom of the big ditch, three by two feet deep. This gathered the water into a deep, narrow channel, which increasing the velocity of the stream, soon by its abrasions, ripped up the adjacent benches, B B Fig. 2, (which represents a transverse section of the canal, down to the bottom of the little ditch *o*.) The ditch has washed out in width and depth astonishingly, since it was cut, contrary to the expectations of many persons, who supposed that the land being so wide and level, there was little or no fall, and consequently the channel would not wash sufficiently, to take the stream in high water. It is now from 40 to 50, and in some places 60 feet wide, and upon an average of six and a half feet deep: and where it passes through knolls, eight or nine feet in depth. There are holes in the bottom ten feet deep; but this is not the uniform depth of the bottom. I observe that the clay parts of the ditch wash more, and more uniformly, than the sandy parts, contrary to the common opinion. The reason for this is obvious. The clay parts of the ditch are less encouraging to vegetation, than the sandy parts; the grass and weeds springing up from which, catches the trash and sediment, and further promoting the growth of weeds and grass, the roots of these hold the banks of the ditch together, and prevent their being washed away. In dry weather too, the clay cracks in large fissures, and when a freshet occurs, the water rising and running into these chasms, sever large blocks of clay from the banks, which tumbling in the water in a dry state, soon dissolve and wash down the current. These lumps leaving scooped places in the banks, the large projections of earth above also tumble in, and dissolve away. There is another reason: the clay freezes in the winter when the water is down, which pulverizing and loosening it, gives the water a prodigious effect on the banks. If there is much fall at the sandy places, then they wash very much; otherwise they do not: for the vegetation then has no time to cover the banks, the sediment being washed away as fast as it accumulates.

In cutting this ditch, it will readily be seen, by looking on the figure, that the current in the old channel is not diverted from its general straight course A B C D E, (which is uniform in all streams that flow in a certain direction towards the ocean, for however they may meander in particular parts of their beds, they have in the main a straight course,) but only diverted from a part of its old bed, A B C D. On the contrary, the stream is directed more into its general straight course, (which is here southerly,) as the figure shows; for if it were continued where it now runs, above and below, it would be in a right line, with it's natural direction, A B C D E; so that it may be considered as only cutting off a large bend or elbow of the creek, about a mile and a half long, following in the measure, all the curves of the old channel. There is much evidence to believe that the stream was once more in this general straight course, (to which attention should be paid in straightening channels,) than when it meandered along the foot of the hill, from whence it has been lately diverted, since the canal now passes through many places which appeared to have been once ponds, (but were entirely filled up when the ditch was cut, with sand, leaves, and rotten wood, as far down as the bottom of the ditch,) no doubt formed by deserted parts, of a very ancient channel, from whence the current must have receded towards the foot of the hill, where it formerly ran; that is, along A B C D. This recession in streams, from more elevated to lower places, is occasioned by the current itself, gradually raising, by depositions of mud and sand, the banks of its channel, above the adjacent ground, (hence the bed of a creek or river lies oftentimes in the highest part of the low grounds,) where if it meets with obstructions, it retires with the fall into the low places, and following the indentations, or natural sinks of the land, it forms numerous curves, and becomes extremely crooked, till the foot of the hill fixes a limit to its further mutation, at least for a time; but as its banks here become higher than the surrounding land, it changes again to the same place probably, from whence it first was diverted.

The clearing and cultivation of land, has had a powerful influence on the mutation of the beds of streams. Subsequent to these operations, the channels of streams have become much straighter, less branching, (that is, the water collected more into one main channel,) and the banks have become much better. By felling the timber, and loosening the soil of the adjacent hills, many ponds and sunken places have been filled up in the low grounds, with the sand and soil washing down from thence; and the streams too, being loaded during freshets, with sand and mud from the same source, have filled up the holes they formerly made, and the parts of the crooked channels they have deserted, and have formed by their increased velocity, and the sediment they deposite in freshets, new and straighter channels for themselves, and higher banks. The executor of the work under consideration, a very intelligent man, and one of observation, and who had had 50 years experience on the subject of mill races, and straightening creeks, observed to me, that before the country was much cleared, when he first turned his attention to the subject of ditching, the streams, where the low grounds were wide especially, divided into numerous branches, and ran in many places, nearly over the whole low grounds, in so much, that it was oftentimes difficult to distinguish where the main current flowed—that the that lands were more indented with ponds, and disfigured with quagmires, than at present. This cannot be ascribed to ditching and draining of low grounds of late years altogether, (for although ditches drain ponds, they do not fill them up, unless a constant current passes through them,) but is owing chiefly to ploughing the hills, and removing the trees from the low grounds, by the trunks of which, the current is divided into numerous channels, and around the roots of which deep holes are scooped out, to the great impoverishment and disfiguration of the land.

At the termination of the ditch C, there is an excellent draw-off for the water; (which is very important in an effectual piece of work of this kind) the old bed of the creek being there wide, and nearly straight for a considerable distance: it is also straight above, at the upper end, which affords a good inlet, which is also very essential; so that the water has a straight course now for about a mile and a quarter, without obstructions. Any one may see at once the advantage of a continuation of the new channel below, and from the crookedness of this part of the creek, may form some idea of the necessity of straightening the natural beds of streams in general; for which purpose, this part of the old channel was appended to the figure. Though my land below this point is very little subject to inundation, except immediately on the bends of the creek, it being for the most part what is called "seconds," and of course out of the reach of freshets. The advantages derived to the land below, by an extension of the ditch, might not justify the expense, unless combined with those resulting to the low grounds above, where the effect would be greater. These two considerations jointly, might justify perhaps, a continuation.

In regard to the execution of the work under consideration, it does not differ materially from what is in common practice. Figure 2, is designed to exhibit at once, the manner of excavating the earth, in cutting the ditch. It represents a transverse section of the canal: *h* and *p* represent the sides of the canal; B B the bottom; *h s p* a line drawn across the top to measure the ditch; *s a o* a plumb line dropped from this to measure the perpendicular depth of the ditch: *o* a section of the little ditch, cut in the middle of the bottom, B B, of the canal. The object of cutting a canal of this sort, that is to contain and carry as much water as possible, depends on the *form* of this figure, for the *velocity* on which the *washing* and *quantity* of water carried depends on it. The velocity depends upon the narrowness of the bottom: but the narrowness of the bottom depends (the width remaining the same) on the inclination of the sides, or the angle they make with the bottom; therefore the velocity is as the inclination of the sides: but the action on the sides and bottom depend on the velocity, therefore the washing depends on the narrowness of the bottom. So that it appears that if the form of the figure was altered in such a manner as that the sides would meet in an angle at the middle of the bottom of the ditch, the velocity of the water would be greatly increased. But as this could not be practised in so large a ditch, the sides ought to slope in such a manner as to make the bottom not more than a fourth of the width of the top. But it must be observed, that if the velocity of the water depends on the inclination of the sides, the caving, which is a consideration, depends on their perpendicular form; so that the ditch ought to be cut in such a manner as to combine the two advantages derived from caving, and increased velocity of the water. The fact that the same volume of water would run swifter by diminishing the width of the bottom, induced me to collect the thin sheet of water running on the bottom B B of the canal, into a channel with a narrower bottom, *c*. But the effects produced by admitting the current into the new channel, we shall notice more particularly hereafter, my object here being simply to show how the work should be executed, without entering minutely into the reasons for it, or to enumerate the advantages derived from it, which come more properly under our second division of the subject. The mouth of the ditch should be cut wider than the other part of it, for 50 or 100 yards down—and a stop made in the old channel. The next means adopted, in point of importance to the canal, to drain the land in question, was the cutting of the margin ditch, and other smaller ditches and conductors, already mentioned, a better idea of which may be had by looking on the figure, than by any verbal description, which would be unnecessarily tedious—when our object is brevity, without leaving out essentials. Sufficient allusion however will be made to them to show their design and importance in the figure, as we pass on.

Having pointed out the method adopted to drain and reclaim the land, we proceed—

Thirdly—To show the effects produced by straightening the old channel, and the advantages derived to the land through which it runs. Besides other advantages which we shall hereafter enumerate, the two principal ones, in view of which the work was undertaken, were completely obtained: that is, a thorough *drainage of the land*, and the *reduction of freshets*.

The manner in which the ditch operates as a drainer, and its absolute necessity in this body of flats, to drain it effectually, will be first pointed out. What renders it necessary to drain a body of land of any description, is the redundancy of water, over what is necessary of that element, for vegetation. This is of three sorts: rain, spring, and pond waters; but as ponds are collections of rain or spring water, they may be reduced to two only. The method which has been adopted to get rid of these, when in excess, is called draining. The aqueducts generally necessary to drain a body of flat land, are eight in number: the main drain, or "main carrier," as it is sometimes called, (a term borrowed from the irrigation of land,) margin ditch, surface ditches, grips, trenches, or what are commonly called water-furrows, pond ditches, pits or perforations, and hill-side trenches, (usually called conductors,) though every ditch, or trench, which carries water is properly a conductor. The main carrier, is a large ditch cut through the middle of the low grounds, the object of which is to intersect all the subterranean passages of water, or veins, that it may flow off, and to answer the purpose of an outlet to the water, more particularly of the margin ditch. The margin ditch is generally a crooked conductor, opened either at the seam of the first and second low grounds, or at the foot of the hill, at the margin of the first low grounds; the object of which is, to receive the water of the surface ditches, and hill-side trenches, and to empty it into the main carrier. Surface ditches, as called from their design to take off the rain water from the surface, are generally cut with a spade, either obliquely (with the *fall*) or at right angles to the margin ditch, and frequently to the main carrier, the object of which is to receive the water of the grips, and to empty it into the margin ditch. The grips are cross furrows, made by the plough and hoe, along an indentation across the beds, the object of which is, to receive the water of the trenches, or water furrows, and to empty it in the surface ditches. The trenches, or water furrows, are made with the plough, and scraped out with the hoe between the beds, and are designed as a receptable of the water which falls on the beds, and to empty it into the grips. Pits, or [illegible], are holes made with the spade, or bored into the ground to sink the water by some subterraneous passage, when it is retained by a stratum of clay, when there is no convenient outlet for a ditch, usually made in basins or ponds. When the stratum of clay is cut through, the water sinks into the land. Places have been drained in this way, where success could not be had in any other. Pond ditches are those which are designed solely to drain off pond water, and should always be cut through and below the bottom of the pond. Hill-side ditches or trenches, when made near the foot of the hill, are designed to take the water which falls on the hill-sides, and tops of the hills from the flats, and to convey it by outlets, as in Fig. 1, into the margin ditches; so that the water which at first falls on the surface of the beds, runs into the water furrows; out of the water furrows into the grips; out of the grips into the surface ditches; out of the surface ditches into the margin ditch; out of the margin ditch into the main carrier; out of the main carrier into the old channel; out of the old or natural channel, into the ocean. But the farmer must not think that now he has gotten entirely rid of his superfluous water—that it is gone forever, and lost in the ocean. Though but a drop in that "bottomless abyss," it will come back again, it may be the very next day, in the form of drops falling on the very spot from whence it started. "The sun riseth, (saith the wise man) and the sun goeth down, and pants for the place from whence he arose. * * * All rivers run into the sea, yet the sea is not full. Unto the place whence the rivers come, thither they return again." Out of the ocean it goes into the air, drawn up in exhalations by the heat of the sun. (or rather the heat removing the pressure of the atmosphere on the surface of the ocean, the water rises, being divided into small particles by absorbing heat, by its specific levity into the air:) out of the air it goes into the clouds, or rather it assumes the form and appearance of clouds; clouds being nothing more than these watery particles made visible by becoming denser. Then comes the wind, and blows them back over the place from whence they came, and being condensed by cold (the absence of heat) and by gravitation, are precipitated in drops of rain, hail, or snow, to the earth. Nor do they stop here: the same law which precipitated them to the earth, continues to roll them on its surface, which is spherical, again into the furrow from whence they started. Thus a constant circulation is kept up. The sun is the grand cause of this circulation of waters, (as he is of the tides) and the winds, which blows them back upon the land, and how strange soever it may appear, is the remote cause of the wetness of the land, and the rivulets of the stream, to whose attractive force, and to the influence of whose heat, nearly all the phenomena in nature may be traced.

But to return. In the foregoing remarks we have endeavored to show that the operation of draining proceeds upon principle: that the nature of the water naturally pointed out the nature of the aqueducts necessary to carry it off of the land; and we might have added, the *figure* of the land, and the *fall*, their direction. We will now show the application of these principles to practice, by a reference to the figure, though little more here is necessary than a reference to the different aqueducts, which has been already made. In this figure, [illegible] the main stream which runs through the land, shows the propriety of a main carrier, A B C, and the [illegible] water of the whole low grounds, and the veins of water making across to the old channel. When this operation was performed on the land in question, spouts of water, after a rain, might be seen all up and down the sides of the ditch, like blood spouting from the section of a vein. The rain water which falls on the second low grounds, and the springs at the margin of the first low grounds, point naturally to intercepting margin ditches. The rain water which falls on the surface of the ground, between the margin ditch and main drain, call for the construction of water furrows or trenches, between the beds; the grips which intersect them, and what we have called surface ditches, as a receptacle for it. The surface ditch, *t*, which connects the margin ditch and main drain, and which nearly bisects this part of the fig., shows this, into which the grips empty obliquely. On account of the high banks that are made on the sides of these ditches, it makes it necessary to run the grips at the foot of these banks, parallel with the ditch, to avoid the necessity of deep and expensive outlets, or terminations of the trenches, through this bank. Such banks in the first instance, should never be formed, but the earth scattered at a distance over the ground. There should be as few of these surface ditches as possible. They are only necessary as outlets, for the grips and trenches, when the margin ditch and main carrier are not convenient. When they are emptied into the first of these, it should be done by the medium of a grip, which may be called a parallel grip. The beds, and of course the trenches, however, should, if the fall admit, run parallel with the main drain. Next, the rain water which falls on the hill-side suggests the propriety of a conductor at the foot of the hill, O P Q R, to turn the water from the second low grounds below, on which it would empty: and the size of the hill, or a number of hills together, and the quantity of water collected in it, show the necessity of occasional outlets, T U V W X Y, into the margin ditch. Pond water, if composed of rain water collected into sunken places, only require straight ditches cut through them, sunk below the bed of the pond, to drain them; (unless it be such as the margin pond of springs before mentioned,) such as the ponds S, S, S, &c., through which the main drain passes. When an outlet is inconvenient, or expensive to cut, and the water held by a retentive bottom, it points to the necessity of perforating the bottom. Nature teaches this when she cracks these impermeable strata by the heat of the sun, and the water sinks in the fissures. Clay lands, and the bottoms of evaporated ponds, crack sometimes to the depth of three or four feet, or more; hence the thirsty nature ascribed of these soils, and the quantity of water they drink through these throats. Where a body of low ground is generally of this character, it requires double the quantity of water in very dry weather, to produce a freshet, these fissures drinking in the water as fast as it spreads over the land. In this way, such soils become very rich, these interstices being filled with the sediment of the water: hence the streaked and veiny appearance of the soil, when cut with the spade. It is through these fissures that so much rain water is collected under the low grounds, in the permeable stratum of sand below the clay. For the water that falls near the old channel, and the springs about the same, that will answer as an outlet which answers the purpose now of another margin ditch along the opposite range of hills at the other border of the low grounds.

By a sort of *comparative* anatomy, the constant circulation of water in the earth and atmosphere, by the distribution of showers, and again draining it off by streams, may be likened to the circulation kept up in the human body by the heart, veins, and arteries: in which the ocean represents the heart, the rivers the veins, which conduct the water to it, and the clouds the arteries, by which after a certain preparation, it is again distributed over the surface, and through the body of the earth. In this system, the main drain A E C, may represent one of these large veins in the body of the low grounds (the *Vena Cava*, if you choose—the largest vein in the human body,) and the minor aqueducts, its various ramifications. The beauty of this system is, that the water is not suddenly emptied all at once into the *Vena Cava*, but by various avenues, gradually enlarging, as the water accumulates.

Thus I have endeavored to illustrate the theory and practice of draining; all the fundamental principles of which, and their application, are embraced in this figure, the most distinguishing feature of which is, the main carrier of the stream A E C.

We will now proceed to point out the manner in which it acts, in the reduction of freshets. Reclaiming of land, subject to inundation, from freshets, is a branch of draining upon a large scale. The principle is the same as in drawing off any other superfluous water. The object of the reduction of freshets, is to prevent the injury of land and the destruction of crops. The former is done by washing and disfiguring it, and the latter by drowning the plant by soaking the roots, or by destroying its structure, by caking the leaves with mud, thus stopping up their vessels. To prevent inundation, either of two things are necessary; that is, either to clean out the old channel, and occasionally straightening its bends, or changing entirely the bed of the stream. In this instance, the latter operation is exhibited. The current here is taken out of a very crooked channel, and made to run in one entirely new, and perfectly straight. The reason why this channel prevents the inundation of the land, will be the principal subject of the remarks which follow. It is entirely owing to the increased velocity, given to the current in it. This depends entirely on the form and construction of the channel. As soon as the current is introduced into this channel, it becomes subject to all the laws which govern the motion of this fluid in conduit pipes and open canals. Hence all that is known of these laws, may be here applied; and hence too, the necessity to the drainer, of a knowledge of these sciences, hydrostatics, and hydraulics, (latterly dignified with the title of hydrodynamics) which make these laws the subjects of their investigation: the first of which concerns the equilibrium, weight, and pressure of fluids—the latter, their motion. If a knowledge of dynamics, (the action of forces on solid bodies residing in motion,) is useful to every one who "owns a horse," in order to understand his speed and tractive powers, surely an insight into the above sciences, will be of no disadvantage to him who owns a canal, to understand the effects of the velocity of its current, and its power on the land. Water is subject mainly to two laws, namely: pressure, and the force of gravitation—whether it is confined and at rest, (for it never is at rest unless it is confined,) or in motion. The first is that force by which its particles press on and against each other, or on any solid body. This pressure is equal in all directions, upwards, downwards, and laterally, and is increased by the pressure or weight of the atmosphere. Upon this principle water spouts from the side of a vessel, when a hole is made into it, and as often as this operation had been performed, the property was first distinctly stated by Pascal. The second is, that force which draws bodies to the earth, or by which a lighter body is drawn by a heavier: and although here, as in the other case, millions of apples had fallen to the earth in the sight of the vulgar, Newton first discerned it, with a philosophic eye. But as these two laws are resolvable into the same (for what is the pressure of water, but its weight; and what is its weight, but the force of gravitation drawing it down?) all the phenomena of this fluid may be said to be governed by the force of gravity.

Let us see now, how the atoms of water are put and kept in motion by these two laws, which we shall consider as distinct, for the sake of clearness. First, by the force of pressure. If the sides of a vessel of water, sitting on a perfectly horizontal level plane, be suddenly taken away, the fluid within will run off in every direction on the plane, even though it have not the slightest inclination, and will continue to run and spread until there is not one particle of water above the other, to press it down when it ceases. The pressure of the water then is as its depth: and therefore as this diminishes, the pressure diminishes, until the water becomes so shallow and thin, that it ceases to run. But its velocity is as its pressure; therefore its velocity is as its depth (when unconfined, and in motion.) Therefore by increasing the depth, the fall (or inclination of the plane) remaining the same, the velocity is increased. The reason of this pressure in water is this: the atoms or particles of water, are so mobile, round, and slippery, and the cohesion of them so slight, that the upper particles pressing upon the lower ones, push them to one side: for the atoms of water are not like lead, or any other compressible substance, the particles of which may be mashed together—but the inferior atoms rather than yield to the superior by compression, slip to one side, and if not confined, they produce motion. In this thing, water or fluids differ mainly from solid bodies: the latter press only at the bottom, but the former have a lateral pressure in addition: and the nearer they approach the nature of fluids, the more they have of this property. Thus, in a barrel of shot, or sand, there is a pressure on the sides; hence such bodies have been called by philosophers, *gross* fluids. The pressure itself, which causes the motion here, is produced by the weight of the atmosphere, and the force of gravitation: but these would not produce motion in a solid body, because they have no lateral pressure. Having started the motion then by pressure, let us see how it is kept up by gravity. Water, like every other body, is subject to the force of gravitation—(with this difference, that its force on water may be overcome by removing the atmospheric pressure, and making the particles extremely light by heat.) By this law, a drop of rain falls to the earth: and if it be caught on the side of a house or inclined plane, it retards its motion some, but it still rolls on, in proportion to the elevation of the plane, until the plane be placed perfectly level or horizontal, when the law of gravitation acting perpendicularly to the plane, pins the drop of water to it and it stops.

If the plane above mentioned then be the least inclined, the motion of the water in the vessel begun by pressure, will be kept up by the force of gravitation: and the velocity or swiftness of the water will be in proportion to the inclination of the plane. Hence we infer that the velocity of the water is always in proportion to the inclination of the plane on which it runs. And therefore by increasing the inclination of the plane, we augment the velocity of the water.

The velocity of water therefore depends upon its pressure, and the force of gravitation, and these depend upon the depth and inclination of the plane. But the depth of the water depends upon the depth of the channel, and the "fall" depends upon the inclination of the plane, therefore the velocity of the water is as the depth of the channel, and the fall which it has. By increasing the depth of the channel then, and the fall, we increase the velocity of the current.

But again the discharge of the quantity of water on an inclined plane, or in a channel, (which is nothing more than an inclined plane, on which the water is confined from spreading laterally,) is as its velocity, therefore the discharge of water in any given time, is as the depth of the channel and the fall of the bottom. The velocity of water in a pipe, or open channel, is as its shortness, for the longer the tube the more the resistance the water meets with from friction on the sides, &c., hence a short tube will discharge in a given time, (of the same aperture,) more water than a long one, provided the head of water to be discharged is the same. By shortening the pipe or channel then, we increase the discharge.

The velocity of water in conduit pipes, or open canals, is in proportion to their straightness. "The motion of a fluid is further obstructed by any violent change of celerity or direction. Whether the channel be contracted or enlarged, the change is unavoidably attended by a proportional loss of impulsion. Any sharp flexure of the pipe or conduit, will occasion a still greater waste of the inciting force."* The retardation of velocity of water in canals and pipes by deflections in them, have been accurately calculated, for angles of every size. Thus, the retardation produced by a right angle, is greater than that produced by an obtuse—and by an acute angle, greater than either. We may infer therefore, that by straightening the channel, the velocity is increased.

These are some of the causes that accelerate the velocity of water, in pipes and canals. There are a variety which retard it. First, by accidental obstacles which it meets with in its course, by crookedness of the channel, &c. By its pressure against the bottom, sides of the channel, and at top by the pressure of the atmosphere against which it rubs. This pressure produces a friction, which retards the motion. This friction is greatest in a stream as you approach the sides and bottom; hence on the surface in the middle of the stream, the velocity is always greatest. Adhesion of the particles of the fluid to the sides of the channel, is another obstacle to motion. We may infer then that in proportion as these obstacles are removed, the velocity of the water is increased; and such as cannot be removed, must be overcome by increasing the velocity.

Having proved then, upon the principles of science, that the motion of fluids in conduit pipes, and open canals, is produced and continued by hydrostatic pressure, and the force of gravity—and that the velocity of this motion is increased, 1st, by the depth of the channel—2ndly, by the inclination of the bottom (or fall)—3rdly, by shortening the pipe or channel—4thly, by removing obstructions—and 5thly, straightening the channel—we will now by way of application of theory to practice, show that all these causes, are in operation to increase the velocity of the current in the canal, A E C, in the figure exhibited above.

First, it is plain that the new channel is deeper, being cut several feet deeper than the old channel, and more uniformly so. This is of great advantage in reducing a freshet; for suppose a sheet of water a foot in depth be spread over a flat 144 feet in width, and a mile in length, it may be sunk into a ditch 12 by 12 feet deep, leaving out the velocity of the water. An enlargement of the capacity of the channel, is of little advantage however, where water is constantly accumulating without increased velocity. This capacity in depth and width of the channel is not stationary, but increases with the velocity of the stream.

Secondly. It is plain that the fall or inclination of the bottom of the ditch is increased: for the fall which was before extended along a mile and a half, is brought within three-quarters of a mile. This makes the difference in the velocity and discharge of water, about the same as between the velocity and discharge of two troughs, one of which is half as long, and double of the elevation of the other (that is doubly as slanting.)

Thirdly. It is very evident by looking on the figure, the distance, and of course the channel, is shortened. The deserted part of the old channel is nearly, if not quite, double the length of the new channel; hence the pipe through which the water now flows, is shorter than the former one; and therefore the velocity and discharge is greater.

Fourthly. It is further manifest that the new

*Dr. Jamieson's Dictionary of Arts, Sciences, &c.

channel is straighter than the old one (to say nothing of other obstructions) water runs much faster in a straight channel than in a winding one, although the banks might be perfectly smooth, and gradually curving; for, when water runs in a right line, the hindermost particles push the foremost ones along straight before them; but in a curvilinear, or angular one, the hindermost particles push the foremost ones to one side out of the way, and the latter having to turn entirely round, describing a circle, and then following on, are retarded in their motion. This is the reason of those little whirlpools, at the edge of the swift part of the stream, next to the eddy parts. In the old channel there are nine large sudden curves, besides numerous smaller ones, which are avoided by straightening the channel. In the last bend, the old channel runs at right angles with itself, where it rushes against the opposite bank, which is fifteen feet perpendicular, which in freshets, would dash the water over the land this side, which of course would break over the low grounds on the other side of the old channel, between this bend and the mouth of the ditch: which is a small piece of flat squared out between this part of the old bed, and a steep hill, running within a few yards of the mouth of the canal, which was formerly subject considerably to inundation, and ought to have been appended to the figure. The curvilinear form of every channel, shows how much a current is opposed to deflections, for let these bends be as sudden as they may, they always turn by a gradual curve, instead of an angle; hence if one stream be let into another at right angles, it will soon change itself more suitable to the direction of the main stream.

Fifthly. It is plain that the stream is freed from a great many obstructions which retard the velocity, besides the bends of the channel, which like so many dams, obstruct its progress, over and through which, it breaks, to the injury of crop and land. Hammocks, (formed by trees thrown across or falling into the old channel, logs, rafts of wood, sticks and trash of every description, bushes growing on the banks, &c.) are constantly turning the stream out of a straight course, which it is ever seeking. The current now runs where there are neither stumps nor trees (on which account too, it was more easily excavated.) As to those obstructions which belong both to straight and sinuous channels, such as come under the head of pressure, friction, &c.—these are overcome in a good measure, by all those causes which increase the velocity of the current in its new channel.

Thus we have shown how the velocity is accelerated in the new channel, and the reason for it; from which it seems it must be more than doubly increased. Now as the discharge of water is as the velocity, the canal must discharge in the same time, more than double the water of the old channel. This rapid discharge prevents the accumulation of water in the channel, out of which it breaks, and inundates the land. And what water is supplied by the freshet is drawn off much faster, and of course the stream is down much quicker. This discharge of water is further increased by enlarging the capacity of the channel, which is the effect also of the velocity of the water, to which the washings, in depth and width, and the cavings of the sides, are always in proportion, for which there is abundant authority. "The increase of velocity [in a stream,] increases the action on the sides and bottom, in consequence of which the width is augmented, and sometimes also, but more rarely, the depth."—*Gregory.*

"A velocity of three inches per second, at the bottom, will just begin to work upon the fine clay fit for pottery, and however firm and compact, will tear it up."—*Du Buat.*

"A velocity of six inches will lift fine sand—eight inches will lift sand as coarse as linseed—twelve inches will sweep along fine gravel—twenty-four inches will roll along round pebbles, an inch in diameter, and it requires three feet three inches per second at the bottom, to sweep along shivery angular stones, of the size of an egg."—*Robison on Rivers.*

There is no danger of a canal of this sort washing and caving too much, a notion which with some, has obstructed this branch of draining. The laws which fix limits to channels, are as certain and immoveable, as the hills themselves. The current and the channel will always adapt themselves to each other, until they become permanent. The effect is produced in this way. As it is the increased velocity of the water which increases the depth and width of the channel, so it is the diminution of this velocity which stops the washing and caving. The velocity of the water in the canal will diminish in proportion to the enlargement of the area of the section of the canal, represented by Fig. 2; or to speak more in the style of hydraulics, "when the sections of a river vary, (the quantity of water remaining the same,) the mean velocities are inversely as the areas of the sections."—(*Gregory.*) That is, as the channel widens, (the quantity of water) the depth diminishes, and of course the hydrostatic pressure diminishes, and the water spreading over a wide bottom, the friction increases, and the velocity of the stream diminishes. Now if a freshet comes, a swift current is formed in the middle of the stream, and the water next to the sides of the ditch is more of eddy: the swift particles of water push the eddy ones to one side, and these being loaded with sand and mud; and the surface of the stream being convex, as represented in Fig. 2, which is represented by the curve line (*t a w*) they roll towards the sides, where they deposite the mud and sand. The reason of this convexity of the surface of streams, which may be seen by putting the eye on a level with the surface, is that the water in the middle, at the surface of a stream, is swifter than towards the sides and bottom, being farthest removed from friction, and being swifter, it loses some of its weight and rises, and being retarded too by the eddy water on each side which it meets with, it accumulates in the middle. The surface in the middle of some rivers, is three or four feet above the edges of the water at the sides; hence a loose boat floats to the bank. The sand and mud are deposited, while the stream is falling. Mud is always deposited by eddy water, and sand by running water. The mud suspended in the water is carried off by the swiftness of the current, while the sand is let fall. But where the water is still, the mud has time to precipitate. This is the reason why the clay is deposited on the edges, and the sand at the bottom. In long dry spells when the velocity of the stream is weakened, it gradually contracts its channel by mud and sand, and the running water fills up all the deep holes with sand, and the bottom becomes smooth. When the current gets the sand to the edge of these holes, losing its velocity, and being able no longer to carry it, it drops it in. If the drought continues, grass and bushes are apt to grow up, and form obstructions. But the next freshet that comes, will sweep out all the holes, and bear off all the banks thus formed; and so on every succeeding freshet, sweeping off the alluvial formations of the preceding one by increasing the velocity of the current, until a "king freshet," puts up a piece of masonry on the sides of the channel, and says to all succeeding ones, "thus far shalt thou go, and no farther—here shall thy proud waves be stayed." Upon this grass and bushes grow up, and thus the bed becomes permanent, from a diminution of velocity, without which, neither rock itself, nor the tenacity of the soil, could fix limits to the beds of rivers, and the earth would be washed from under us.

Having pointed out the manner in which the new channel operates in the prevention and abatement of freshets, we will briefly enumerate some of the changes which have resulted, and the benefits which have been derived to the land since the excavation of the main carrier.

In the first place, the old channel is fast filling up, and trees are growing from the bottom of it. My intention is to speed this operation, by cutting a small ditch through the middle of the bottom. This will drain the string of ponds, and by admitting the two little branches R, R, into it (which now serve to change the water in the old channel,) will form a current that with the aid of freshets will fill up all the holes.

Secondly—the land may be cultivated to the waters edge, in the old channel and the trees cut down, and the bushes grubbed up to the same, and shortly the bed itself be cultivated, for corn is now growing on a part of it, which is as high as the adjacent ground.

Thirdly—the old bed affords an inexhaustible source of manure—a compost of sand, mud and leaves.

Fourthly—all the washed places are filling up, some of which produce better than the adjacent ground. The little useless ditches also, and the ponds, S, S, S, S, are filling with mud and sand. Any pond now may be filled with sand, by passing a current into it out of the ditch; or drained, by cutting one out of it into the main drain. The land of course now is more level, and brought more in a body for the plough, which may at length cross all these places.

Fifthly—the island formed by the old and new channel is gradually becoming higher, from the deposites of the freshets. If you can ever get a current to surround a piece of land, it will soon raise it out of the reach of freshets, for the eddy water is always in the middle of a circular current, and where the eddy water is, there will be the deposites. The current in this instance takes off earth from the opposite bank all around, and throws it on the island; hence islands and peninsulas, or the bends of a channel are generally the highest parts of low land: and hence too, they are richer from the deposites, than other places. The formation of islands is handsomely illustrated by filling a vessel with water that has a little sediment in it, then whirling it round, when the sediment will be collected in a little pile in the centre of the bottom. Here the water is eddy in the middle, but formed into a swift current on the sides of the vessel, which it washes severely. In this way a single snag in the water, by forming a current around itself, in the form of a whirlpool, has formed an immense island. They are also formed by cutting across the bends of the creek.

Sixthly. The current now never breaks out of the new channel unless it is where it crosses indentations in the land, or some washed place formerly made by the current of the old channel; which when it happens, only serves to fill them up. Before it could break out of the new channel, it would run round the old, first filling up all the low places of the low grounds, (for the land through which the canal passes is the highest part of the ground generally.) This is evident from a property which belongs to water, to equalize itself, or as it is commonly called, to "seek a level." And even if it should break with violence out of the new channel, the distance to the old channel is so far, that it would soon lose its velocity, by spreading over the ground, or meeting the eddy water of the old channel, and so pour out all its sand. Lately, during the greatest freshet I have ever seen in the stream, the current at one place was diverted from the new channel, occasioned by a fish-dam below, which interrupted the fall about two feet, but instead of an injury, it was a great benefit to the land, for the sand which it gently distributed over the surface of a stiff part of the low grounds, was of incalculable benefit to it; and the wheat then growing on the spot, was not a little benefited by this top dressing of "alluvial formation."

Seventhly—any kind of crop may be now cultivated on the island, or any part of the low grounds, with perfect safety; and if there should come a freshet to inundate the land more than ordinary, and the water should spread over any part of it, it would be so much reduced, and so shallow, that it would rather be a benefit than an injury to either land or crop. In this point of view, I look now upon every freshet that may occur. It may be observed that what might be thought a very moderate freshet in the winter season, would be considered an extraordinary one in the summer, when crops are growing. It requires a vast quantity of rain even to fill the channels in the summer season.

Eighthly—the character of the land is vastly altered. Where it was inclined to a stiff clay loam, it is now of a different color and texture—not half so stiff—more open and spungy—drier, and more easily wrought.

Ninthly—the freshets are down in half the former times, and consequently less mud is deposited on the crop, which is the effect most injurious to crops in freshets. Besides, the current being swifter, less mud is deposited on that account, but more sand. A dull sluggish stream deposites nothing but mud.

Tenth—ample outlets are now offered to all the necessary ditches, ponds, &c. the margin ditch in particular, which on account of its length, (being nearly as long as the old channel) could never be kept open, is now intersected nearly in the middle, near the pond S. Before this, it emptied into this pond, which never could be drained until the main drain A E C was passed through it. Several attempts had been made to drain it by the ditch *s e*, but on account of the depth of it, (about six feet,) the little fall to the old channel, and the back-water of the old channel in freshets, which constantly filled it up, &c., they proved ineffectual till this main gut, if I may so call it, was passed through this stomach of the low grounds, where all the sand, mud, wood and water collected, and cleared it of its foul contents.

Eleventh—it should not be discarded from the list of advantages that such a ditch, answers very well the purposes of a fence. My standing pasture is in a good measure enclosed by the main drain and margin ditch: nor should a plenty of clear fresh water for the stock in it, furnished so conveniently by the new channel, be thought unworthy of consideration.

Twelfth—how advantageously such a system of draining and reclaiming could be connected with irrigation, is obvious from a single glance at the figure. An inundation of the whole plat of ground, bounded by the margin ditch and main carrier, is completely practicable, with little labor and expense.

The particular advantages here enumerated, derived to the plat of land exhibited in the figure, when properly drained and reclaimed from the injurious consequences of inundation, are not confined: they are such as would result from a general adoption of a similar method, and may be held out as some inducement of a further prosecution of a branch of husbandry, of which little hitherto has been done, and perhaps less known, than any other operation of farming. The increasing scarcity with many, of good land; the exhaustion of the highlands; an acquisition of rich and productive land by draining and reclaiming; an exemption in a good degree from the pernicious effects of droughts, so common in this country, by cultivating moist land; a connection of draining with a well regulated system of irrigation; an improvement of the country in point of health; a connection of draining with a system of enclosing; the permanency of fences on water courses, secured by straightening channels; and finally the abatement of freshets, so universally destructive to crops, and an abridgement of the time they would remain upon the land, and the preclusion of a great deal of anxiety to the farmer, are inducements that ought to render this subject more generally popular. The obstacles to such undertakings, have been already mentioned in some previous numbers of the Farmers' Register.* To these, some addition might be made of some of those that have stood in the way of success, after the work had been undertaken.

First—these are an ignorance of some of the most common properties of water, and the laws which govern its motion.

Secondly—want of judgement in executing the work, is another obstacle, by producing ill success and discouragement. This is manifested frequently, (besides in various other ways) in taking a stream out of a very crooked channel, along the foot of the hill, and running it in one equally as crooked, along the margin of the opposite hill, for the sake of a lower place, and getting the land more in a body. It is evident that nothing is gained in this instance by the diversion of the stream, it being in a situation precisely similar to the one in which it was at first, and the land still subject to excess of water, on account of its width, for the want of a main drain passing through the middle. Sometimes an attempt is made to confine a stream by a shallow ditch, in this situation, and a high dyke, in a narrow passage, between the dyke and the hill. The consequence of this is, the water when a freshet occurs, on account of the narrowness of the passage, the hydrostatic pressure of the water (which is as we have already seen, as powerful laterally, as in any other direction,) and the crookedness of the channel, the water bursts through the dyke, over the land, and makes a joke of the vain and injudicious attempts of the drainer to confine it. Besides, the water here running nearly on the surface of the ground, (the hill and the dyke answering in the place of banks) it makes all the land adjoining the dyke, too wet for cultivation; and the channel after awhile, on account of the deficiency of "fall," will fill up with mud, and render the stream still more liable to overflow. Water is a dangerous element to trifle with, where you run counter to all its laws and properties—(as in this case,) but concur with these, and it is easily managed. When the flood-gates are hoisted, and the freshets are high, if you then attempt to confine it in a shallow, level, crooked, and confined channel, "it will laugh at your calamity, and mock when your fear cometh," and the desolation of your crop, like a whirlwind. The ditch should be cut through the middle (if practicable,) of the land, for the sake of the fall, straightness of the channel, its depth, and higher banks, and to act as a main drain.

Thirdly—meeting with rock, is another obstruction; on the account of which, numberless undertakings have been abandoned, after much labor and expense. To avoid these, (which are apt to be met with, in hills and rising ground in the flat land) the stream should not be conducted too much out of its general straight course, which is the case when it is taken through ground much higher than the bed of the old channel, or is cut into the hill-side, when it meets with knolls, or little plats of rising ground. As they are generally of short extent, the new channel should not be curved to avoid them. In the ditch under consideration, mentioned above, there were several places of this description; but as they were small, and the rocks were detached, they offered no obstruction, except in one place, where the canal approached very near the foot of the hill, at the pond S, where the rocks which projected out of the hill, (which formed one bank of the ditch there) and run partly across the bed, were a little stratified; but they were easily removed, and the current has a sufficient passage.

Fourthly—the fear of losing too much land by the washing and caving of the ditch, is with many, an obstacle to ditching on a large scale. But it must be recollected that where we lose land in one place, it is counterbalanced by gaining it in another; for every foot washed away by the new channel, one is added on to the old, by the depositions of freshets, besides enabling you to till nearer the water, and the general acquisition of

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*See communications *On Draining*, Nos. 7 and 12, Vol. I.

land by drainage, and the prevention of freshets.

Fifthly—even religious scruples, or rather superstitious notions, have troubled many upon this subject. They seem to think it sacrilegious to divert a stream from its ancient bed, where the Almighty has placed it, and put it into one entirely new. But let a flood occur that threatens total destruction to their crops, and they are perhaps the very first persons that lose their submission to an overruling providence. This spice of devotion to streams, is very ancient. I imagine, should any one attempt to change the bed of the sacred Ganges (as it is called,) all the pilgrims of the East, would be in arms against him; where they resort in "numbers numberless," to pay their superstitious homage to that watery god, and to sacrifice their offspring. Some may be surprised to hear that such an obstacle should exist to draining; but such is the fact: nor need we be surprised at it. Superstition has in all ages retarded, not a little, the progress of knowledge. The suggestion of Gregory, that the sun was fixed, and the earth revolved, was condemned as a heresy by the church, and the support of it provided a prison by the Inquisition, for Galileo. But we will not digress.

Sixthly, and lastly—the fear of incurring expense, has been the prime cause which has obstructed this kind of work. The work is begun, and a pretty good way is made into it, when all at once, it is abandoned. "Too expensive—it will cost more than the land is worth to finish it:" and thus all the labor is entirely lost. A little rock, perhaps, is found in the bottom of the ditch, and for fear of spending 40 or $50 to remove it, $400 in previous labor is entirely thrown away, and a great deal of land destroyed. How many undertakings of this sort, which either from want of judgement in the design, or from partial execution of the work, or from both causes, are every where to be met with, and remain the monuments either of the ignorance, or the penuriousness of the undertakers.

To do the work effectually, and profitably then, we must be determined to go through with it, cost what it may. If we first "count the cost," and find it likely to be profitable, if it cost half the worth of the land, or even the whole worth of the land, (that is what it would sell for before draining and reclaiming,) for it might increase the value of some land that was not worth five to twenty dollars, or even to fifty. Nothing is more expensive than the cultivation of wet, undrained land, (and whose crop is not pitched in a good portion of this sort every year?) and nothing more deceptious. The land has the appearance of being rich, and indeed it is, and we try it every year, though we are as often disappointed.

It is better to cultivate the most barren hills on your plantation, than the richest spots subject to excessive wetness; for they not only fail of a small produce, but they produce nothing at all, whereas the most barren hill will produce something. In fact, the "sobbed" parts of a plantation are the poorest parts on it, when permitted to lie undrained—but if thoroughly drained, the very richest. From the value of not more than a cent, they may be suddenly advanced to 20 or $30 per acre, or more. And the value of the crops lost from excessive wetness, for one or two years, would do the work effectually. Is it not profitable then, to lay such places dry if ditching is expensive? Where profits counterbalance expense, however great, there is no expense at all.

The straightening of a part of the channel of the stream, on which I reside, (Twidie's Creek,) by cutting the ditch exhibited in the figure, and an attentive operation of its observation for five or six years, has given rise to the foregoing remarks. If they can be of any benefit to any one having lands in a similar situation, the author of them will feel amply requited for his contribution.

N. E. READ.

From the Ohio Farmer.

THE FRUIT-DRIER.

Having found a fruit-drier a convenience in family economy, I am induced to give a short description of it, and its uses, *pro bono publico*. Take two boards 18 inches wide and 4 feet long, set them on end by the side of the house—on the top nail a cover, extending a little over the front, and leaving an inch open at the back, to allow the air to pass freely—make 10 or twelve drawers 3 feet long, 3 inches deep. The sides of common stuff, the bottoms of half inch stuff, split into narrow slits, and with brads fastened five-eighths of an inch from each other, so as to let the air pass freely; on these slats lay the fruit; the drawers may be taken out on sunny days, and in case of rain, and at night, they may be replaced. In this way the fruit is never moulded, and much labor is saved. The fruit requires no moving, and the drawers can be replaced with very little labor, and the drying goes on in rainy weather and at night.

From Loudon's Gardener's Magazine.

LIQUID MANURE.

Liquid manure may be here [at Ghent] named, and very justly so, their *summum bonum;* as if applied when the corn is sprouty, or just before a rain, it has an effect which no other manure can have. It destroys insects, and throws a surprising degree of vigor into the crops. It is pumped [from the tanks under ground, into which it is conducted by drains from the stables, &c.] into a barrel-shaped water cart; and, when brought upon the land, the plug is taken out, and the liquid, flowing over a board something in the shape of a fan, as the cart proceeds, is dispersed on both sides, over a space, perhaps, of 4 or 5 feet. The cart has generally three wheels.

From the Cultivator.

FENCE POSTS.

An excellent method of rendering these durable in the ground, is published in the American Eagle. It consists, 1. In peeling the posts, and in sawing and splitting them if too large; 2. In sticking them up, under cover, at least one entire summer; and 3. In coating with hot tar, about three feet of the butt ends, which are to be inserted in the ground—after which they are ready for use. We have no doubt the advantages of this mode of preparation will more than remunerate for labor and expense. Our reasons for this belief are briefly as follows: The sap of all non-resinous trees, will ferment in the presence of heat and moisture, and cause the decay of the wood. To prevent this natural consequence, the first object should be, when a tree is felled, to expel the sap from the pores of the wood. This is done by peeling, splitting, sawing or hewing, and exposing the wood to the drying influence of the sun, or at least of the air. The process is facilitated too by immersing the wood in water for a time, which liquefies the sap, and favours its expulsion. And when the moisture has been expelled, the next object is to keep it out, by paint, tar or charring. In the mode recommended above, the moisture is expelled by the peeling, sawing and summer-drying, and its return is prevented by the coating of tar. The retention of the bark upon timber is particularly prejudicial, not only in preventing evaporation, but affording shelter to various species of the borer, which, under its cover, carry on their depredations upon the timber. We have seen pine logs nearly destroyed in a summer by worms, where the bark had been left on, while those which had been peeled remained uninjured. The best timber is obtained from trees which have stood a summer, or a year, after they have been girdled and peeled.

From the New York Farmer.

SAXONY SHEEP.

[The following is an extract from a reply to a paper republished in the Farmers' Register p. 45 Vol. III.

There is in Saxony a breed of sheep which were introduced and reared with great care by Augustus, Elector of Saxony and King of Poland, which, in commemoration of the introducer, have been called the electorial breed. I was brought up in that country to rural husbandry, particularly to the care and management of sheep, and perfectly acquainted with the purest and most celebrated flocks. From these I selected my sheep, and brought them to this country. They bore the fatigues of the voyage remarkably well, and arrived in safety. I sustained some little losses at first, from being a stranger to the peculiarities of the country, from having to hire my sheep kept, for want of suitable accommodations, and of such fodder as I wished. During the last eight years, and since I had a farm of my own, I have not lost over $1\frac{1}{2}$ per cent.: for the last year not more than 1 per cent. The last two winters I had no loss, and the last year I raised 101 lambs, from 100 ewes, one only of my eyes having twins. The sheep which R. speaks of do not shear more than $2\frac{1}{4}$lbs. My flock, last year, of 200 ewes and lambs, averaged 2 lbs. $6\frac{1}{2}$ oz. If I had had a proportion of wethers, they would probably have averaged 3 lbs. My grown bucks sheared $4\frac{1}{2}$ lbs. He says they (that is, the sheep he speaks of,) are poor nurses: my ewes are uncommonly good. All these facts can be abundantly proved from my sheep records, in which births and deaths, and every thing of importance, is recorded, and from credible witnesses. All these facts, in which there is no guessing, show conclusively that R.'s statements about the pure breeds of Saxon sheep did not allude to my sheep at all; and therefore I hope there will be no unkind feelings between us.

Respecting the "*miserable*" quality of the meat, if R. will produce the best sample of the South Down mutton he can find, I will meet him at any place he shall name with a sample from my Saxons: both shall be cooked in the same manner; he shall select one or more of the most accomplished connoisseurs in good eating, and I will rest that point on their decision.

I have but one little statement more to add, and I will then leave the subject to the public. The prices current of wool in New York, given in the Cultivator for the last month (May) are for Saxony, 80 cents; for half-blood 53 cents, and for native, 33 cents. Now, allow my ewes to produce $2\frac{3}{4}$ lbs., (and they will rather over-go than fall short of it.) then at 80 cents the fleece will bring \$2 40. Allow the South down ewes to shear 4 lbs. and allow it be to equal to the half-blood merino, and the amount will be \$2 12. Allow the Bakewell breed to produce 7 lbs., which is 1 lb. more than R. rates them: this at 33 cents will be \$2 31. The three fleeces will stand thus:

Saxon,	2 40
South Downs,	2 12
Bakewell,	2 31

With these remarks, I submit the subject.

HENRY D. GROVE.

From the Farmer and Gardener.

DIRECTIONS FOR SOWING THE SEED AND RAISING THE PLANTS OF THE WHITE ITALIAN MULBERRY TREE.

1. To sow an ounce of seed, prepare a bed 50 feet long and 4 feet broad. Manure it well with a compost composed of $\frac{1}{3}$ stable manure, $\frac{1}{3}$ ashes, and $\frac{1}{3}$ decomposed leaves from the woods, or garden mould: dig deep, pulverize finely, and then lay the bed off in drills 12 inches apart, $\frac{1}{4}$ or $\frac{1}{2}$ of an inch deep; sow the seed as thick as you would onion or parsnips; cover with rich mould, press the mould down gently, but sufficiently to cause the seed to come into contact with the earth; and should the weather be dry, water the seed bed every other evening, it will assist in promoting the germination of the seed and vigorous growth of the plant.

2. Keep the beds clean of weeds; and should they receive an occasional watering with suds or soot and water, say once a week after they are up, if planted this month, August, they will be fit to transplant into nursery rows in April next, or if not desirable to be so removed, they may be permitted to remain until the ensuing spring, care being taken to keep the bed clean of weeds, the earth stirred, and watered in dry seasons.

3. The second year, if not removed before, the plants must be removed into the nursery rows, which must be prepared as for any other crop. The ragged roots being taken off and the tap root shortened, the plants must be planted out 12 inches apart in rows three feet apart, the earth to be well trodden around the plant. As before, the earth must be kept open and free from weeds.

4. At two years old, the plants may be planted out into hedges, at 18 inches apart in rows six feet wide. The ground should be prepared as before directed and some good rich mould put into the holes, to be pressed around the plant. If intended to be planted out as standard trees, 20 feet square

apart would be good distance; but in that case the plants should not be transplanted until they are about an inch in diameter. In either case they will require trimming and topping, and if kept as hedges should be treated as other hedges are.

ROBERT SINCLAIR, JR.

From the Salem Landmark.

PROFESSOR SILLIMAN'S SECOND LECTURE ON GEOLOGY, ABRIDGED.

Internal fire or Volcanoes.

The lecturer said it was a tremendous thought, that the centre of the earth was a vast mass of liquid boiling flame. But that it was so, was in the highest degree probable. He then glanced at the volcanic regions on the globe, beginning with Iceland, which is wholly volcanic, being the hottest and the coldest country in the world. He said it was well ascertained that Sweden was rising out of the water, at the rate of about four feet in a century; that is, the ocean is gradually receding from the shores of that country, as the water marks plainly indicate. This he supposed to be the expansion of that part of the crust of the earth, produced by the internal heat.

In England there are no volcanoes, and no evidence that there ever was any. But in the city of Bath there are heated waters which are known to have existed in their present state for more than two thousand years. These waters can be heated only by internal fires.

In France there is a series of extinct volcanoes along the borders of the Rhine. They are also to be found in Spain and in Portugal, in Italy and in the islands of the Mediterranean. A volcanic island emerged from this sea about four years ago. There is, therefore, reason to believe it reposes on a bed of fire. There is abundant evidence that volcanoes have been in Palestine: the last probably were those connected with the destruction of Sodom and Gomorrah. They are clearly traced around the Caspian Sea, and in the centre of Asia.

In the Azores, the existence of forty volcanoes is discoverable. So likewise they are found in the Madeira, the Canary, and the De Verde Islands, in Madagascar, Bourbon, along the Red Sea, in Sumatra, Java, Kamschatka, and on the north west coast of America. Mexico is a peculiar volcanic region, and so is the whole western side of South America. They have not existed on the eastern side. Sufficient relief has thus far been had on the western coast, but should these safety valves be obstructed for any length of time, very probably there would be volcanoes on the eastern coast.

The Pacific Ocean to a very great extent stands upon a basis of fire. There are on the globe three hundred chimneys, through which the fire can escape from its prison in the centre of the earth. Volcanoes are very justly denominated safety-valves, the conservative principles of our globe.

The invariable precursor of a volcano is an earthquake, generally attended with loud detonations. Chasms are opened in the earth, and sometimes cities are swallowed up. Changes in the atmosphere are also visible. The seasons are irregular; animals utter cries of alarm; dizziness of the head is experienced by men.

The waters of the Ohio were affected by the earthquake at Lisbon. In the eruption of a volcano, rocks are dashed against each other, and either ground into powder, or broken into fragments. White smoke first emerges from the crater, then black, rising like the trunk of a tree.

The most remarkable volcano on the globe is in the island of Hawaii, one of the Sandwich group. This has been visited and scientifically examined and described by the American Missionaries, to whom Mr. Silliman awarded high praise, not only for their christian zeal but for attainments in science and literature. Science as well as christianity is under obligation to them for their devotedness and enterprize.

The cause of volcanoes is internal fire. That it exists, there is very satisfactory evidence.—There is a gradual increase of heat as we descend into the interior of the earth. At two miles below the surface, water will boil; at ten miles below, rocks become red hot. The frozen [or solid] crust of the globe is supposed to be about forty miles thick. We cannot be perfectly secure against the effects of this fire. The crust of the earth is at any time liable to be broken. Our security and dependence are upon Him who made the world, who gave to matter all its laws, and who controls its wonderful movements.

The sun is a body of fire, occasionally exhibiting dark spots on its surface. Mr. Silliman suggested those spots might be produced by the formation of a freezing crust like this which covers our globe. If so, the time may come when the sun shall all be frozen over, and there shall be no more light or heat to cheer or warm this solar system. For the consolation of this audience, he said they would not be here when such an event should happen.

For the Farmers' Register.

ACCOUNT OF MARLING LABORS, EXECUTED UNDER GREAT DISADVANTAGES.

When any laborious or expensive improvement or process is referred to as worthy of imitation, and as promising profit to those who possess (and neglect) the means for like operations, it is very common to hear it said in reply, and with an air of triumph, as if the reply was quite conclusive—"Oh! Mr. —— has plenty of money: that's the whole secret. Give *me* the like means, and *I* could do as great things." So far from this being true, there are very few farmers whose means are scanty, and who fail altogether to improve their lands, or their practice, who would not be found as deficient, if their wealth was increased to any extent. No one will deny the great advantage of capital, in facilitating improvements: but still it may be asserted, that where there is no profitable improvement without surplus funds, there would be none with any amount of them whatever. The common remark quoted above, is applied as often as in any other way to marling; though numerous facts, as well as reason, are ready to contradict its truth. There are very few new improvements in agriculture that are made early use of by poor farmers—either from the slowness with which information reaches them, or because the eventual profit is not so certain as the expense. But with marling, at least on the south side of James River, it has been remarkable that many poor farmers have engaged in it earlier than many of the rich, and (in proportion to their respective means,) have performed much greater labors. It matters not how laborious an improvement may be, if its profits are sufficiently sure and speedy—and that such are the returns from marling is sufficiently proved by the labors of such persons as are referred to—though unfortunately, for want of proper knowledge, much more than for want of capital, their efforts have seldom been well directed, and have therefore failed in reaching their full and proper share of reward.

One of the most striking cases of this kind is presented in the facts which it is the design of this paper to communicate. These are obtained from Edward A. Marks, Esq. of Burley, Prince George, who at the request of the writer, took pains to obtain, and to make written memoranda, of all the facts which his own means of observation had not previously supplied—and whose close neighborhood, and business as a farmer engaged successfully in like operations, gave him every facility to obtain correct information.

The father of the individual whose labors will be stated, left at his death a tract of very poor land, amounting to about 200 acres, which according to law, was divided in portions of equal value, among his eleven children. The widow's third for life, was, as usual, laid off around the dwelling, and embraced nearly the whole of the cleared land. As is also most usual, the shares to be given into the immediate possession of the legatees, were useless to all of them: but more fortunate than most persons in the like situation, they were enabled to sell out their respective shares to one person, at a full price, but not without being compelled by law, to pay a lawyer's fee, and other legal expenses, to obtain a decree of the court for the sale. Such is the *penalty* which our law then imposed, and though moderated, still imposes on all who are required both by public and private interest to sell rather than retain small shares of land, unfit to support their owners.

The eldest son, Mr. John Moore, bought in all the other shares, on a credit, and executed bonds for $24 for each. The purchase included the right to the reversion of the widow's dower, to be received after her death.

Low as this price may appear, it was more than enough for the value of the land, considered with a view to cultivation, as both the cleared and the wood land were too poor to promise any clear profit on the expense of cultivation, even supposing the clearing of the latter to cost nothing. This is however precisely the situation of many who till the poor ridge lands of this county, and who neither improve, nor can expect to improve the small rate of return for their labors. The wood land in question, was well timbered—and this, more than the crops to be obtained by cultivation, was the resource counted on by Mr. Moore, like all other proprietors of similar lands. But Petersburg was his principal market, and his staves, shingles, laths, and other light timber, had to be drawn in his single-horse cart sixteen miles, and the usual price of a load would scarcely pay ordinary wages for the actual time and labor employed in getting the timber, and conveying it to market. Still, unremitting labor made him thrive on this miserable business: which is only to be accounted for by considering that every hour which most others equally necessitous would have given to idleness, or search of pleasure, he devoted to labor—and that small as the returns were, all of them were saved, and judiciously used. Some of his heavy timber could be sold as it stood—but this was rare, and he had neither the necessary money, (or the boldness to risk more debt,) to hire labor, &c., to go largely upon sawing building timber for sale.

While engaged in this laborious course, gradually clearing and extending his cultivation, and as gradually paying his bonds, he first witnessed, on the lands of his neighbors, the effects of marling, and became desirous of obtaining similar benefit. He had no marl on his land—and though his neighbors would freely give the use of their beds, the distance remained a great obstacle. Not discouraged by this, as most richer men would have been, he began marling in the autumn of 1826. His whole force then consisted of his two sons, one 12 and the other 10 years old, himself, and one excellent horse. He never owned a slave. At a later time, and on some few and special occasions, he also hired a man to assist his labor for short periods. During all this time, and until his death, Mr. Moore drove his cart to Petersburg with a load of timber about once a week. Of course, his marling was only carried on at such times as could be spared from his necessary labors of timber getting and selling, and of cultivation. In stating his force, it is but fair to add a part, which, though not of much use in out-door labors, has an important bearing on every man's means of living—and in no case was the benefit greater than this. Mr. Moore's wife and two daughters were patterns of industry, and no doubt greatly increased the gains of his honorable labor and economy.

Mr. Marks does not pretend to state how much space was marled in any one year—but from a view of, and familiar acquaintance with the whole body of land, he is sure that in the eight years, during which the labor was irregularly carried on, that the space covered was more than 75 acres. The distance was never less than 800 yards—and the greatest was 1900, by supposition.

The marl used in 1826, was on the land of Josiah M. Jordan. The pit was very wet, and the labor greatly increased by the flow of water; and the marl had to be thrown up about six feet to the place where the cart could stand to be loaded. The marl was rich.

In 1827, marl was obtained (and always afterwards) from Mr. Marks' land, Burley, which had been postponed until then by the owner's being previously under age, and the scruples of his guardian as to giving permission. Since then, Mr. Marks has had as full opportunity of being acquainted with his neighbor's marling, as with his own, both being from the same locality, and generally from the same pits.

In 1827, the marl used by Mr. Moore, was dry, and of good strength, but hard to dig; and he had a steep hill to ascend, for want of a suitable road being cut. The rate aimed at was 350 bushels to the acre, and it was more often exceeded than fallen short of.

In 1828, there was about three feet of over-lying earth to remove, to get from below it a thickness of four and a half feet of marl. No other change.

In 1829, a one-ox cart was added to the hauling force—that carrying three and a half bushels of marl—the horse loads five bushels. The covering earth removed was more than five feet thick, and five and a half feet of marl was got out.

In 1830 a good road out of the ravine, and up the hill, had been made by Mr. Marks, suitable for his own marling, and this Mr. Moore afterwards used instead of his previous steeper ascent. A pair of small oxen was now used instead of the single ox.

In 1831, the work was changed to a pit of marl of inferior quality, wet, and more difficult to dig. The quantity was increased to 400 bushels the acre. The youngest son this year was so much injured by a fall, as to remain an invalid as long as his father lived; and the little labor which he was able afterwards to perform, was not any thing like a compensation for his support. On this account, a white man was hired for about nine months of this year.

In 1832, two single horse carts were used, the lame youth driving one by riding. The wet pits were worked in dry weather, and when wet, the dry bank. The average cover of earth five and a half feet, and the marl obtained about the same thickness.

No change occurred in 1833. In 1834, no marling was done, as before the usual leisure time of the year had arrived, the death of Mr. Moore occurred. He was attacked by the new and fatal disease of our country, cholera, when returning from Petersburg, and would have died on the road, but for being found and carried by a friend, to breathe his last at home. He had been to carry the last of his crop of wheat to market, and the price which he brought back, sufficed to pay off the last of the bonds due for his land, then almost doubled in amount by the accumulation of interest.

A few years before his death he had purchased the life interest of his father's widow, in her dower land (exclusive of the building.) For want of means to keep the land fenced, it had previously been thrown out of cultivation, and had remained a common range for the cattle of the neighborhood, and yielded no profit whatever to the possessor. This is one of the many cases in which land holders, and especially widows, (as life owners,) are robbed of the whole income which their land would yield, by the operation of the law of enclosures—which law, notwithstanding, is upheld in argument, and in practice, as peculiarly beneficial to the poor. The widow was glad to accept three barrels of corn annually, for more than fifty acres of cleared land, which was yielding her nothing. Mr. Moore had marled about fifteen acres of this after his purchase, and had cultivated part of the land one year before he died.

It would be a source of much gratification, if when thus recording the facts of so uncommon an amount of labor and expense having been incurred by a very poor man to improve his land, it could be also stated that his labors were judiciously applied, and met with a proper share of reward. But this end was but imperfectly reached. The effects of marling seen on his neighbors' lands were sufficient to induce Mr. Moore to commence this great labor—and the effects which he derived from his own applications were such as satisfied him on the score of profit, and caused him to persevere with increasing energy to the last. But his land was at first vilely poor—and even when doubled in product by marl, was still poor. He had before (as is the common practice on such land,) taken a crop of corn from each of his two fields, every second year, and left the land to rest the intervening year. After marling, the land was immediately fit for wheat, and (being quite stiff,) even more fit for that crop than for corn. This tempted him to take a crop of wheat in what was before the year of rest, and thus there was a grain crop every year—and besides, the land was grazed bare between the wheat harvest, and the next winter's ploughing for corn. He was warned by some of his neighbors, who had better means to know the theory of the operation of marl, that his course would prevent the manure giving half its benefit, and would in fact make it the means of destroying the little stock of natural productiveness which his land possessed. He was perhaps incredulous as to what was so opposed to his previous opinions of other manure—and his scarcity of cleared land, and necessities, urged him to this improper, and indeed, destructive course—in which however, he did no worse than many others who have not the same excuse, of wanting land, money, or means of being informed. Under these circumstances, it is not strange that the land marled shows but little of the productiveness which different treatment would have insured, and which has been obtained elsewhere.

But however much this result is to be lamented, it in no manner impairs the value of the lesson taught by the labors of John Moore—which is, that extensive and valuable improvements by marling may be made by farmers who are placed under the most disadvantageous circumstances, as to want of capital and labor, and without any of the facilities which are commonly supposed indispensable to encourage and aid such undertakings. There was not only the absence of spare capital, spare labor, and spare time—but the continued presence and pressure of privation and of debt. Above all—there was the want of information, and of any existing mode of general communication amongst farmers, which would have served to make known this man's meritorious efforts, and brought to him that applause and encouragement which he so well deserved, and the information and aid which he needed. His efforts were scarcely heard of, except by his nearest neighbors—and except the gift of the marl, he had no aid of any kind. It was unfortunate for John Moore that this want of means for intercourse among farmers should then have existed: it is not less so for the community, that for the same reason, his praiseworthy exertions should have been permitted to be spent almost in vain. To make known such efforts, to direct, and to encourage them, would be among the most useful operations of agricultural journals, and agricultural societies: and by such a course, they would promote the public interest in a far more important degree, than that of the particular individuals whose merits and necessities would deserve their attention and aid.

E. R.

From the Tennessee Farmer.

ON MAKING MEADOW.

In the upper part of East Tennessee, the following course will be found the most advantageous mode of making a new meadow, where the land is not very foul. Let the land be cleared by grubbing it well, and taking off all the timber by the first of August, then rake up the leaves, chips, &c. and burn them: after which harrow the ground repeatedly, until the weeds and grass are completely destroyed, and the soil on the surface well pulverised, then sow turnip seed and harrow it again, after which sow timothy seed thickly, and brush the land over with a light brush. The bottom will thus be smooth, the turnips and timothy will both do better than if the land had been ploughed, and the latter particularly, will be far better set, and endure much longer. By breaking up the land, the roots, will be broken, and much labor rendered necessary to remove them, so as to prevent obstructions to the scythe, while the grass, instead of being benefited, will be greatly injured by the ploughing. Take care to sow the grass seed thick, sowing one-half the seed in lands in one direction, and the other half in lands crossing the first, so that the seed may be as evenly distributed as possible. By this means, the first crop of hay will be found to be as good and as clean, as any succeeding one. It is a very common, but a most injudicious practice, to break up the land with the plough, by which the grass is not only injured, but in spite of all the care which can be taken, snags, or pieces of the roots, will be left standing up, well calculated to break scythes and to obstruct the mowing. A false economy also, is too often resorted to, of sowing too little seed, depending on the ground to seed itself from the first crop: the consequence is, that the weeds spring up in such abundance, as to render the first crop of grass of little or no value, and the land is moreover rendered so foul, that in a short time, it will be necessary to plough up the meadow, whereas, by a liberal application of seed in the first instance, the first crop of hay would have been clean and valuable, and much of the filth smothered by the grass. This mode of seeding highland meadow here recommended, has been repeatedly tried by the editor with uniform success. Whether it would answer as well on the more sandy soil of the western part of East Tennessee, unless in favorable seasons, is doubtful; but if the turnips be dispensed with, and the timothy seed be sown late in the fall, or in the winter, he has no doubt it would prove equally beneficial in those soils. If old land is to be converted into meadow, after ploughing and well harrowing the ground, the seed should be sown liberally as before stated, and the roller run over the land once or twice immediately after sowing, and again in the succeeding winter or spring, while the ground is tolerably dry. When the meadow begins to fail, let the seed become perfectly ripe before mowing, immediately after, harrow well with a large harrow, and if practicable, apply a dressing of manure. The meadow will thus be renovated, and again yield fine crops of clean hay. It must not however be forgotten, that timothy is an exhausting crop, and that therefore, to render a meadow of this grass permanently productive, it must be aided by occasional applications of manure. If the land be wet, a mixture of the seed of the herds grass or red top, will be very advantageous. If the land be very soft, or even miry, the herds grass alone should be sown, and it will form a most valuable and durable meadow. We must caution our readers however, if they wish to preserve good meadows, to avoid excessive grazing on them, and particularly, not to permit stock to run on them while the ground is soft. This destructive practice so common amongst us, is more injurious to our meadows than all other causes combined. It is one of the many instances of false economy to be met with in our agricultural practices, by which pounds are sacrificed to save pence. A meadow should by no means be pastured in the winter or spring.

From the *Code of Agriculture* of the 5th Edition, 1832.

ON THE MEANS OF PREVENTING THE RAVAGES OF 1. SLUGS; 2. GRUBS; 3. THE WIRE-WORM; AND 4. THE WHEAT FLY, (OR TIPULA TRITICI,) ON OUR CROPS OF WHEAT.

Among the various difficulties with which a farmer has to contend, in raising his crops, the ravages committed by a variety of the more diminutive tribes of animals, are much more important, and carried to a far greater extent, than is generally apprehended. These vermin are of several sorts; but the principal are, 1. Slugs;—2. Grubs, or large maggots;—3. The wire-worm;—and 4. The wheat-fly. The three former devour the plant when young; the latter attack the ear when it is coming to maturity.*

It is proposed to give a short account of the various measures hitherto adopted, for preventing the injuries to which our crops of wheat are liable from these destructive animals, accompanied by any recent suggestions for that purpose.

1. *Slugs.*—These are properly "naked snails." They abound in spring, but only appear early in the morning, and late in the evening, more especially when the weather is warm. In the day time, they destroy the roots, and in the night, the blades, and other parts of the young wheat which they find above ground. They deposite their eggs in the earth. Powdered salt, saltpetre, and quicklime, are destructive to slugs; but lime-water is the most effectual, the least drop of it killing them. For that purpose, some diligent farmers collect by means of pea-haulm, under which they shelter themselves, and they are then destroyed by a watering pot, by means of which, lime-water is sprinkled over them, when the haulm is removed. Sulphuric acid, even diluted, would probably answer the same purpose. Rolling the ground at night, or treading the surface with sheep, &c. are useful practices for the destruction of this species of vermin.

2. *Grubs.*—These are worms or maggots produced from the eggs of beetles, which ultimately are transformed into winged insects of the same species as their parent. They are likewise called "the rook worm," rooks being so fond of them.

* Fields of wheat sometimes appear blighted early in the spring, by a small insect of the grub or caterpillar kind, lodged in the centre, or very heart of the stem, just above the root, but the plants afterwards recover, and shoot afresh. The insect is called the *musca pumilionis* by Linnæus, from its effects on rye, on which it chiefly feeds in Sweden, rendering the plants it attacks dwarfs. Annals of Agriculture, vol. xvi. p. 170; Trans. Linn. Soc. vol. ii. p. 76.

They do great injury to the crops of grain, by undermining and feeding upon the roots of the plants. They are hardy in their egg state, and, when grubs, are invulnerable to the weather; but when passing from the aurelia state, rain and cold weather will destroy them. This maggot is so destructive, that if every season were equally favorable to its production, it would soon render the world a desert.

Various remedies have been recommended for destroying them, in particular, sowing salt with the seed—strewing barley chaff on the surface, so as to entangle and destroy them—spreading quicklime, or saltpetre over the field, before the plants get up—employing ducks to devour them—rolling the earth, more especially during the night, when the grubs are generally on the surface—and treading the surface with sheep or pigs, and sometimes even with horses.

3. *The Wire-worm.*—This is a noxious animal, abounding both in old grass-lands, and in clover leys. It is very difficult to destroy them, as they are peculiarly tenacious of life. For five years, the wire-worm remains inhabiting the earth, till it changes its nature, and becomes a winged fly, (the Elator segetis of Linnæus.*) Some recommend, as the surest and most effectual means to get rid of them in old grass lands, to pare and burn the surface. Others suggest the sowing of spring instead of winter wheat, on the idea that the culture, at that season of the year, would destroy them. A plan has recently been suggested by Mr. Radcliffe, an intelligent clergyman in Ireland, of paring the surface of old leys—accumulating it in great heaps in the fields, and planting the field, and even the heaps with potatoes. By this means, a valuable crop is raised—the destruction of the wire-worm is insured—and an immense quantity of valuable earth, full of rich substances, is obtained. Another effectual mode of destroying the wire-worm is to plough the clover stubble in July, as soon as the crop of hay is taken off, or the land has been cut for soiling, and then to sow it with cole seed, on one furrow, to be eaten down by sheep. The treading of the sheep will effectually destroy the worm, and the wheat may be sown with safety in November. But the simplest mode of destroying wire-worms is to delay ploughing till December; for it the land is then ploughed, they would be exposed, in a torpid state, to the frost, and the inclemency of the season.

That the reader may be induced, to pay more attention to this branch of the inquiry, it may be proper to state, that according to the most accurate calculation that has hitherto been made on the subject, no less a quantity than 60,000 acres of wheat *in England alone*, are annually, either greatly affected, or completely destroyed, by this noxious animal.†

4. *The Wheat Fly.*—But of all the injuries to which wheat is liable, perhaps there is none more to be dreaded, or which is likely to be more severely felt, than that which is occasioned by a species of the fly, whose depredations have been felt in other countries, as France, and America, as well as Great Britain.*

1. *France.*—The depredations of insects in the district called the *Angoumois* in France, are well known. They began their ravages in one peculiar canton. They successively spread through the whole of that district, and afterwards penetrated into the neighboring provinces, particularly those which had any settled intercourse in corn with the Angoumois. Grains that have appeared quite perfect, have each contained one caterpillar. This is soon transformed into a butterfly, which becomes the stock of an innumerable line of caterpillars. It is thus that so deplorable a calamity spreads so quickly. But it requires a combination of several causes, (which fortunately does not happen very frequently,) to favor the increase of these little animals, otherwise they would soon overrun any kingdom, and destroy the food of its inhabitants.†

2. *America.*—The celebrated Hessian fly in America, is another insect of the destructive effects of insects. It got the name of *The Hessian Fly*, because it was supposed to have been brought over in the straw-beds and baggage of the Hessian troops employed in the American war, who were first landed, an. 1776, in Staten Island and the west end of Long Island. It was there where the insect first made its appearance, and thence it spread into the southern district of New York, part of Connecticut, and Jersey. In the countries which it ravaged, the destructive powers of this insect are represented as in the highest degree alarming. In some districts, it is said to have so entirely cut off the produce, "that able farmers had not got at harvest a sufficient quantity of wheat for domestic uses, and, indeed, that they sometimes failed to reap the amount of the seed they had sown."‡ During the period that the Hessian fly was so celebrated for the mischief it occasioned, the government of this country, prevented the introduction of wheat from America. Such precautions are not useless. The Egyptian bean has an insect in it *of considerable* magnitude, which completely devours the kernel of the bean before it becomes visible. This species of bean has been raised in some parts of England, and the same insect is produced. Some means should be adopted, to prevent the dissemination of so pernicious a production, otherwise the public will sustain a very considerable injury, which, by wise precautions, may be prevented. Any risk of this mischief spreading might have been prevented, had a public institution existed, to warn the farmer of his danger from its dissemination.

In the years 1787 and 1788, the greater part of the southern provinces of America, were infested

*See Trans. of the Linnæan Society, vol. ix. p. 160.

† See Trans. of the Linnæan Society, vol. ix. p. 158.

* A valuable paper on the wire-worm will be found in the Stockholm Transactions for the year 1777.

† M. de Hamel du Monceau has written a work, entitled, "Histoire d'un Insecte qui devore les grains de l'Angoumois, avec les moyens que l'on peut employer pour le detruire." Paris, 1762, 514 pages in 12 mo. This work details the advantages of all the methods hitherto proposed, for preventing the ravages of weevils, moths, and every other species of vermin that attack corn.

‡ See Malcolm's Survey of Surry. vol. ii. p. 258, on the authority of Dr. Mitchell of America.

with another insect, called there the "*Flying Weevil*," which, when full grown, is a minute moth, somewhat resembling that which breeds in, and destroys woollen clothes. This insect is unfortunately well known in Europe as well as America. In fact, it seems to be the same insect that is called "The Wheat Fly" in this country, and which has recently been so destructive in several districts.

3. *Great Britain*.—The mischief done by the wheat-fly in various parts of the kingdom, in the course of the year 1829, and the two preceding years, is frightful to contemplate. In one district in Scotland, (the Carse of Gowrie, in Perthshire,) the destruction it occasioned was estimated at little short of forty thousand pounds.* In many cases, the crop was not worth the cutting down; and in other instances a fourth, a third, or even a half of the produce was destroyed. The myriads of this vermin, and the facility with which they fly from one field to another, in search of the plants in which their eggs can be safely and efficaciously deposited, seem to place their depredations beyond the powers of man to control; and hence it has been asserted, that the only means of avoiding the mischief is, either to give up the culture of wheat until the race is destroyed, by the want of the plants necessary for continuing the species, or by patiently waiting, until seasons destructive to them naturally occur. If Providence however, has created so destructive an insect, as the *tipula tritici*, or wheat-fly, it has been no less attentive, to prevent its becoming too numerous, by making it the food of other insects. Indeed, there are no less than three *ichneumons*† who seem to be intrusted with the important office of restraining, within due limits, the numbers of this destructive species, otherwise it would become too numerous to be subdued. The most extraordinary circumstance is, that one species of these ichneumons lays an egg near the egg of the fly. They are hatched at the same time; and it is ascertained, that the maggot from the egg of the ichneumon, either lays its egg in the body of the caterpillar, when it can get at it, or devours the maggot, and thus preserves the wheat from its attacks.‡

It is not here proposed, to enter into any philosophical discussion regarding the origin of the wheat-fly. It is sufficient to remark, that in the spring, and in the beginning of the summer, a species of fly is frequently found, in great numbers, which attaches itself to the heads of wheat, when the ear begins to appear, and where it deposites its eggs, which in about ten days after they are placed in the ears, become maggots or caterpillars. These destroy the young pickle, by sucking up the milky juice which swells the grain, and thus, depriving it of part, and in some cases perhaps the whole of its moisture, cause it to shrink up, and so to become, what in the western parts of England is called *pungled*.§ In about three weeks after, when it has exhausted this substance, it drops upon the ground, where it shelters itself at the depth of about half an inch from the surface. There it remains in a dormant state, until the mean temperature is about 50°, when, vivified by the warmth of spring, it becomes a fly, about the time that the wheat produces the ear.

It is evident, that the same plan, that in our climate has been found so effectual for destroying the wire-worm, would be equally destructive to the wheat-fly, namely, that of leaving the soil which has produced the wheat untouched till November, and then exposing it to the inclemency of the weather, and in particular to the action of frost.

The great difficulty attending this plan is, to devise an advantageous course of crops, consistent with the idea of putting off the ploughing of the wheat stubble till November or spring. In the celebrated four years' rotation, 1. Turnips, 2. Barley, 3. Clover, 4. Wheat, the wheat stubble, as a preparation for the turnip crop, might first be ploughed shallow, and then a deeper furrow taken, by which the fly would be buried,* scarifying and ploughing at the same time, and ploughing shallow in spring.

I scarcely think it possible, that the fly can be destroyed, if the wheat is succeeded by clover, unless, perhaps, by severe rolling and treading.† The minuteness of the caterpillar, which is no bigger than the ordinary roman letter C, will preserve it in a great measure from the effects of pressure.

It is a great advantage attending any plan for the general destruction of this vermin, that the young embryos are in general deposited in the fields "where the wheat grew."‡ Under a proper system, therefore, the race might in a great measure be extirpated in any particular district. It is absolutely necessary however, that there should be a general combination for that purpose. Nothing done in the field where the new wheat is sown, can be of any use, for the fly is produced in fields, not under wheat at the time, and flies about, until it finds a plant suitable for its purpose.

In seasons, when the frost may not be supposed sufficiently violent, the desirable object may be obtained, by frequently stirring the ground, and by rolling and treading it, or burning stubble upon the surface, or by the use of hot-lime. Fumigations of tobacco or sulphur, made when the wind is favorable, might also render the ear disagreeable to this insect.§

If other means are ineffectual, surrounding the field of wheat with a belt of hemp, the smell of

* Mr. Gorrie, an eminent gardener in the Carse, calculates it at £36,000.

† Trans. of the Linnæan Society, vol. v. p. 102, where they are described by Mr. Kerby.

‡ See this interesting fact explained in the Quarterly Journal of Agriculture, published by the Highland Society, No. 5, p. 301.

§ See Transactions of the Linnæan Society, vol. iii. p. 302,

* This is a plan recommended by Mr. Gorrie in the Carse of Gowrie.

† An instrument, at the same time, might be invented, similar in principal to the machine used at bleachfields for beating linen, which would probably destroy the maggots of the wheat-fly in the young clover by compression.

‡ Mr. Sheriff has ascertained, that embryos are likewise deposited in the *triticum repens*, or couch grass, which delights to grow in hedges, and other neglected situations; but these could easily be extirpated.

§ Transactions of the Linnæan Society, vol. v. p. 105.

which is so peculiarly noxious to insects, might be tried.* The smoke of burnt weeds, and in particular of *sea weeds*, might also be of use.

In the course of these inquiries, I have seen very strong assertions, made of the beneficial effects of *elder*, in protecting growing plants from the attacks of insects; in proof of which it is said, that when a whole district was infested with cockchafers, and scarcely a green leaf was untouched, the elder alone remained uninjured. This plant is said, 1. To preserve cabbages from being injured by caterpillars; 2. To prevent blights and other effects on fruit and other trees; 3. To protect crops of wheat from destructive insects; and, 4. To prevent the destruction of turnips, by the fly, if elder bushes are drawn, for that purpose, along turnip drills.

It is recommended, to beat the cabbages with twigs of elder, or to make a strong infusion of elder water, and sprinkle it over the plants with a watering pot.

It has been remarked, that the greatest mischief is usually done to the late sown wheats, and that such as are sown early, receive little or no injury. When the grain has arrived at a certain degree of hardness and consistency, (which may be the case, with the early sown wheats, before the insect has made any material progress, or even commenced its operations,) the plant is not so liable to be injured.

Conclusion.

It is much to be lamented, that so important an object as the means of preventing the destruction of our most valuable crops of grain, should not have attracted the attention of government; by whose means, discoveries might be made, which can never be expected from private exertions. By public encouragement, the inquiry would be carried on with energy, and probed to the bottom; and the most effectual means of preventing the mischief, would probably be ascertained. What subject can be compared to it in point of importance? At present, we are liable every year, not only to the loss of some millions worth of grain, but to all the mischiefs of scarcity, and even of famine. These would not probably be experienced in this country, were the ravages of insects, and the destruction by the mildew† prevented; objects which are certainly in a great measure attainable, if the inquiries regarding them were prosecuted with vigor, and if no expense were spared in collecting facts, and ascertaining, by careful experiments, the means by which such frightful losses might be prevented.

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* It may be proper here to mention a curious fact recorded in the Survey of the Hebrides. A cottager there, had his cabbages much injured by the caterpillar. He surrounded his little garden *with hemp*, and was no more molested by them, the smell of that plant being noxious to insects. The same idea exists in France, as appears from the following paragraph: "Quelques personnes ont cru reconnaître, qu'en semant du chanvre sur toutes les bordures d'un terrain, les chenilles n'ont point dépassé cette barrière, quoiqu'elles infestassent tout le voisinage." *Code of Agriculture*, 4th edit. p. 523, note.

† The writer of this paper, from his zeal to promote the improvement of British Agriculture, was led personally to examine the husbandry of the Netherlands. He there found, that "*The Rust*" or mildew, which frequently occasions such devastation to the crops of wheat in England, was scarcely known. He prevailed on the Board of Agriculture, to offer premiums for the best accounts of Flemish husbandry; and regarding that point in particular, several valuable papers were sent over; but unfortunately, about the time they arrived; government had resolved to abolish the Board, and actually sent all the papers belonging to that institution, (and these most valuable documents among the rest,) *to the Tower of London*, where they still remain, carefully locked up, as if information that might prevent the miseries of scarcity or famine was unfit to be promulgated, and should be carefully concealed from the public eye.

SEED OF THE BREAD-FRUIT TREE.

To the Editor of the Farmers' Register.

I send you by my friend ——, a few, of a few, seeds of the celebrated "*bread-fruit.*" In its native climate, it continues in use for eight months, and so various are the messes made of it by the Otaheitans, that Capt. Cook was led to say of it, "if in those parts where it is not spontaneously produced, a man plant but ten acres in his whole life time, he will as completely fulfil his duty to his own, and to future generations, as the nature of our less temperate climate can do by ploughing in the cold of winter, and reaping in the summer's heat, as often as these seasons return, even if after he has procured bread for his present household, he would convert the surplus into money, and lay it up for his children." Not only does this fruit supply food, but clothing, and numerous other conveniencies of life. It was for the purpose of transplanting the bread-fruit tree to the West Indies, in a growing state, that his majesty's ship, the Bounty, was despatched in 1787, to the South Seas, under command of Lieutenant, afterwards Admiral Bligh.

I send you also a few locks of long glossy and silk-like looking wool, from the skin of the famous Angora goat, sent to me from Constantinople, by the gallant and intellectual Porter—one of those rare spirits, who here and there rise aloft by their courage, enterprise, and talents, to illustrate their country, as do "cloud-capt towers" to embellish a city.

For the bread-fruit, should these seeds produce it, as they may in our southernmost region, the country will be indebted to Mr. Norris, a very young gentleman, who is much to be commended for his thoughtfulness in bringing them. For acts of less apparent national utility, some men have gained enviable immortality: for after all, what so deservedly confers immortality as the consideration of having added one more to the means of national subsistence and comfort.

J. S. SKINNER.

Baltimore, July 30, 1835.

It is believed that the best disposition has been made of the few seeds which were enclosed in the foregoing letter, by placing them in the care of two gentlemen of the South, to whom this journal and its readers are under many obligations. Our thanks for the gift, are due to our esteemed correspondent.

From the *Code of Agriculture*, of the 5th Edition, 1832.

ON THE ROTATION OF CROPS ON THE ESTATE OF HOLKHAM, BY FRANCIS BLAIKIE, ESQ.

When an account is given, of the rotation of crops in any particular estate or district, it is proper, that the soil and situation should be described at the same time, so that the reader may be better enabled to judge of the propriety of the system. For instance, upon Mr. Coke's estate in West Norfolk, which is celebrated for its good husbandry, the soil varies from light dry sand, to strong loam, retentive of wet. But the greater part of the land is a friable sandy loam, naturally poor, but very productive, from being kept in a high state of cultivation. The subsoil of the whole district is calcareous, and is called clay, marl, or chalk, according to its texture.

First Rotation.

The best, or first class of this land, is cultivated, either upon the four course shift, or upon the four and six courses alternately, as follows:

The Four Course Shift.—1. Turnips well manured, and part of the crop eaten upon the ground, or turnips and mangle wurzel, ("field beet,") in alternate ridges of four or more drills: the beet all drawn off, and consumed in the yards—and turnips eaten upon the ground;—2. Barley;—3. Red clover, mown once;—the second crop folded, and eaten off by sheep—a fresh piece being set out every day;—4. Wheat.

The Six Course Shift.—1. Turnips well manured and part eaten on the ground;—2. Barley;—3. White clover and mixed seeds, mown once;—4. Pasture;—5. Peas;—6. Wheat with manure. Thus, in the ten years, the land received three dressings of manure, exclusive of the sheep-fold; and produced two crops of turnips, two of barley, two of wheat, one of peas, one of clover hay, one of mixed grass hay, and one year's pasture. The four or six course shifts, taken alternately, are preferable to a constant repetition of four course husbandry, and should be adopted, whenever a convenient opportunity occurs.

To a person unacquainted with the management of light arable land, and the use of rape cake, it will appear, that the three dressings of manure here mentioned, exclusive of the sheep-fold, are extraordinary high farming. But when the expense, and speedy application of the manure are pointed out, the wonder ceases. Thus, the average price of rape cake, including the expense of breaking the same into a powdered state, has, in the last ten years, been about 5£ 10s. a ton, and that quantity is usually allowed to three acres of land; and suppose rape cake manure only is used, and three dressings given in ten years, the whole comes to eleven shillings per acre per annum. The expense of laying on the manure is a mere trifle. A common wagon carries enough for six acres at one load; and one man sows by hand, broadcast, three tons of rape dust in one day, with which he covers nine acres, and for which the usual pay is one shilling a ton or fourpence the acre. The Holkham horse machine, for sowing rape dust broadcast, is more expensive than the hand process; but it spreads the manure more regularly, and is more expeditious. It is particularly calculated for large farms.

Second Rotation.

Cropping for the second class of land.

A Four and a Five alternate Course Shift.—The occupier uses his discretion in having any particular part of the farm in a four course, and other parts in a five course, so that, "on the whole, he has not, in any one year, more than four-ninth parts of the said arable lands, under crops of corn, grain, or pulse."

The four crops on land of the second class, are, 1. Turnips well manured, and all or nearly all the crop eaten upon the ground;—2. Barley;—3. Red clover, mown once, the second crop sheep-folded, and if a weak crop, the stubble is mucked, or oil caked for the succeeding crop;—4. Wheat.

The Five Course.—1. Turnips well manured, and all, or nearly all the crop eaten upon the ground;—2. Barley;—3. Mixed grasses, mown once;—4. Pasture;—Wheat with manure. In the nine years, the land is manured three or four times, exclusive of the sheep-fold: and produces two crop of turnips, two of barley, two of wheat, one of clover hay, one of mixed grass hay, and one year's pasture.

Two years grass' layers upon light land, are liable to be stocked with wire-worms. Where that misfortune is apprehended, it is advisable to *reece-balk* the land in preparation for the wheat crop. The reece-balking, or rib-balking, is done soon after midsummer, and is performed by a common wheel plough with a broad-winged share. The land is only half broken; the turf or flag in the alternate rib, being skimmed off about two inches deep, and thrown flat on its back, the grass side down upon the unbroken ground. The effect of this practice is, that the wire-worms and grubs creep to the outsides of the ribs, and are eagerly picked up by the rooks. Those sagacious, useful birds, are generally in close attendance when wire-worms and other destructive insects are plentiful. Gamekeepers raise a hue and cry against rooks, pretending, that they destroy the eggs of pheasants and partridges. Those people are generally more attentive to the raising of rabbits, than they are to the preservation of birds; and the poor rooks are a convenient apology for the deficiency of game. When there are no rooks, the gamekeepers attach the blame to the cuckoo, to unfavorable weather, &c. &c. &c.

There is no loss in pasturage, from reece-balking two year's layers upon light land. The spring feed is eaten off before the ground is broken, and the grass grows vigorously afterwards, from the sides of the furrows in the ribs, and produces more good sheep feed than if the turf had not been disturbed. In the autumn, the broken turf is harrowed across the ribs, and drawn into the spaces from whence it was cut. The turf on the unbroken ground is also tendered, or half rotten by the time, from the broken turf having lain upon it, and thence excluding the air. The ground is then manured all over, generally with rape cake *in cobble*, and in the proportion of about a ton to three acres. The ground is immediately ploughed at the usual pitch, considerably deeper than the reece-balking, and the broken turf effectually covered. The wheat seed is thus drilled in at a proper season.

When wheat is sown on light land, upon two years' *olland*, or layers unbroken, it is apt to suffer in winter, not only from the depredations of wire-worms, but also from the frost heaving up the turf, and breaking the roots of the plants. Rolling and treading are good preventives.

Third Rotation.

The third class of land is thus cropped.

The Five Course.—1. Turnips well manured, and all the crop eaten upon the ground by mixed stock; the treading of neat cattle, along with the sheep, in such cases, is greatly beneficial to very light land;—2. Barley;—3. Mixed grasses pastured;—4. Pasture;—5. Wheat highly manured, or oats without manure.

Fourth Rotation.

There is a fourth class of light land in West Norfolk, still inferior, which is occasionally cultivated, and at other times used as sheep pasture and rabbit warrens. That land, when broken up, is usually pared and burned, and sown with rape for the first crop;—2. Rye or oats;—3. Turnips well manured, and all the crop eaten upon the ground by mixed stock. Other food being given to the stock at the same time, in cribs and troughs placed on wheels, and frequently shifted upon the turnip ground; a most commendable practice, and peculiarly suitable for all poor light soils. 4. Barley, well seeded with white clover, narrow-leaved ribgrass, and other permanent grasses;—5. Pastured, and so continued for a series of years, until the moss plants overcome the grasses; when the ground is again broken up, and undergoes a course of aration as before.

In the description here given, of the various rotations of cropping and manuring, no mention has been made of the application of calcareous substances. On that subject, it is only necessary to observe, that an intelligent and attentive farmer, does not require a chemical analysis of the soil, to direct him when calcareous manures ought to be applied. Experience, founded on common sense, is his unerring guide; he knows, that the cultivated soil requires a dressing of calcareous matter, when he sees his crops become proportionably more productive of straw than of corn. When the straw, particularly that of barley, becomes soft and feeble, or, as it is called, "lazy," and bends down, and knuckles under the weight of the ear—when the scythe in mowing, rather breaks than cuts it—also when the land shows an unusual disposition to produce annual weeds, such as the corn marygold, &c. these are certain indications, that the cultivated soil is deficient in a due proportion of lime. The subsoil dressing is usually laid upon wheat stubble, in preparation for turnips; also, upon two years' layers, in preparation for wheat, and sometimes upon young clover, immediately after the barley is carried off, and the harvest is over.

For the Farmers' Register.

COMMERCIAL REPORT.

The business of the present year has been very favorable to the interests of the farmers and planters of Virginia, and indeed, of the Union generally.

The price of tobacco, which may be considered the great article of export from Virginia, has been higher than for several previous years; and although some decline has recently taken place, so small a portion of the crop remained in the hands of the planters, that their interests have suffered little by the reduction in price, while the large crop produced has added greatly to the aggregate sum obtained from this source.

It appears that about 42,000 hhds. were inspected in Virginia up to August 1st, being 6,500 hhds. more than the year's inspection to October 1st, 1834; but as the facilities of getting it to market have been greater this year, there may be less received during August and September, than in the corresponding months of last year. Besides this increase in Virginia, there were 10,000 hhds. more received at New Orleans this, than last season—say 34,200 against 24,200 to 1st of August, 1834.

The price of the lowest quality, in the Richmond and Petersburg markets, has scarcely been under $6, during the last two months—and from this price up to $12, the great mass of sales have been made. At present the latter price is not exceeded, except for such as is peculiarly adapted to the use of certain manufacturers at home.

The markets in Europe might, without any considerable decline in price, bear the large addition which they will receive to their diminished stocks, but that the prospects of the growing crop are so favorable as to excite some apprehension of an over-supply next year; and therefore a continuance of present prices during another season is very improbable.

Something has been said of a change in the regulations of France concerning this article, and it is very desirable that it should be placed on the same footing as other articles of commerce, to be freely bought and sold, instead of the government reserving to itself the exclusive right to sell a segar, or a pinch of snuff. The liberation of the trade however, is not soon to be expected.

It is ascertained with some approach to accuracy, that the crop of cotton produced in the United States last year, was between 1,238,000 and 1,242,000 bales, an increase of about 35,000 bales on that of the year previous, although the crops of the Atlantic States were very unproductive. About 980,000 bales have been shipped to Europe, and 200,000 consumed in this country. The price has not varied essentially during the last two months, varying from 17 to 19 cents. The cultivation of this article has produced a rapid increase in the wealth and population of the South-Western States, and an immense emigration to them continues to proceed from the Carolinas and Virginia. The present year's crop, if not affected by early frosts, will be much larger than any previous one, and may prove that the growth can overtake the consumption.

The price of wheat has disappointed the expectations of the farmers; for although the crop is short, and the quality generally good, the price is lower than last year. The millers have ceased their unprofitable competition, and the markets of New York, Pennsylvania, Maryland, and Virginia, are about on a par. Wheat may be quoted $1.15 to $1.25 cents.

Among the recent importations at New York, are wheat from Ireland, and beans from Trieste—

the former paying a duty of 25 cents per bushel. Large shipments would have been made to this country had the price of wheat advanced to $1.50 per bushel.

The crop in all the Atlantic States is generally estimated to be considerably less than an average product.

Corn had reached a high price ($5.50 to $6 per barrel,) a few weeks ago, but has declined to $3.75 to $4. The prospect of the growing crop is favorable beyond precedent, and there is no doubt that corn will be cheaper the ensuing season than it has been for many years. The abundance of this article insures that of others of the first necessity.

Money has been abundant—Stocks of every description command good prices. Loans for purposes of internal improvement are readily obtained on favorable terms. Rail roads are extending in every state, save one, and hopes are entertained that this one (a southern neighbor,) will not long remain an exception.

X.

Aug. 22, 1835.

EXTRACTS OF PRIVATE CORRESPONDENCE.

——— (*Western Penn.*) *July* 12, 1835.

In this section of the country we are in the back ground. Our land is the best—the markets latterly very good—the climate and water unsurpassed—but yet there does not exist that spirit of improvement, which is developing itself daily in other sections of the country. I attribute the torpidity to the *almost entire absence of agricultural publications among our farmers*, and their total want of information on the science of agriculture. I have actually seen *stables removed to get out of the road of the manure*, and have seen farmers (professedly,) *throwing the manure from the hog-pens into the streets.* I will give you an anecdote illustrative of the spirit of improvement with which we are favored. A Quaker from the lower counties was visiting this section of Pennsylvania; and a farmer wishing to show all the conveniencies of his plantation, directed the attention of the Quaker to an improved plan he had in execution for removing manure from his stables; which was by a run of some magnitude, which he carried to his stable door, and which from the rapidity of the current, carried off the troublesome trash fast as it was thrown into it! Do we not need a more general dissemination of information among the agricultural portion of our community?

—

King William Co. Aug. 5, 1835.

This year I have three acres in Guinea grass, which having been once cut for green food, the second crop is now securing for winter provender, believing from an experiment of last year, it will be found a profitable adjunct to our provisions. Two other cuttings may safely be calculated on.

After much doubt whether the gama grass could be advantageously raised here, my conclusion is, that the greatest difficulty arises from obtaining the first plants from seed; after that is effected, other lands may speedily be covered with sets, to any extent, and with but little labor.

Fauquier Springs, Aug. 20, 1835.

I learned on my way up here, that the wheat I sent you along with the Turkey wheat, is simply called *blue wheat*, and that it was brought from Ohio by a gentleman of Hanover. I know not whether the misnomer originated with me or with some friend from whom I received a description of the wheat. It is a very inconsiderable affair at any rate; but I had always rather correct my own errors than have it done for me by another.

—

Warwick Co. Va. Aug. 12, 1835.

In this county, so far as I have the opportunity of judging, the activity of farmers increases as time rolls on. Those who have marl busily employ the time allotted to such work, in carting and spreading it over the land—others who have not, are beginning to make use of lime, oyster shells in a decomposed state from the river banks, woods' litter, &c. &c. We begin to sow clover here for improvement. It is a late thing, and owes its adoption here to the introduction of the Farmers' Register. Those who have adopted the four-field system, as recommended in your Register, (corn, wheat, clover, wheat,) look forward with great expectation of success, both in improvement and profit. Our crops of corn are very promising.

SEASON AND STATE OF CROPS.

There has been no drought in August, of which there was fear, and on the contrary, as much rain as was desirable for the growing crops. Of course the previous fine appearance of corn continues, and may now be considered as assuring a very good crop—it being now safe from drought, and every other casualty except of freshets on low grounds. But farmers are as apt to be too sanguine, as too desponding—and as we endeavored to moderate the excess of despondency respecting the loss in the wheat crop, and the hope of a very high price for the quantity made, we now express the opinion that the corn crop will not yield in proportion to its appearance, and still less in accordance with the general and exaggerated anticipations. The whole growing season has been unusually wet for the climate of lower Virginia—and though apparently not injuriously wet, it will be seen that the unusual growth of corn is more in the stalk and leaf, than in the grain—which we believe is always the case in wet seasons, with regard to every crop.

In wet seasons, all crops run more into blade—and in dry, the grain is better made than is promised by the parched and stinted appearance of the entire plants. When any region has generally and decidedly a moist, or a dry climate, the truth of this opinion is made too plain to be mistaken: if wet, it is a country good for grass, or for crops of which it is desirable to increase the general bulk, without regard to the seeds—and if dry, it is more profitable for grain crops, or those of which the *seeds* are by far the most important product.

The season has been good for clover, especially for the second growth. The land under clover throughout August has been in sufficiently good order for ploughing, and the whole season for fallowing for wheat may be counted on as decidedly favorable.

No moth weevil yet seen in the wheat, or in old corn. The unusual severity of last winter served to destroy nearly all of those which, if spared, would as usual, have produced a progeny of millions, by this time. This rare exemption is precisely in accordance with the views presented in the article on moth weevil in Vol. I p. 325, and furnishes strong confirmation, in one respect, of the correctness of the opinions there expressed of the nature and habits of this insect, and the means of preventing its ravages. Still we have not learned that the piece referred to has attracted any notice, or produced the least benefit to the public. The wheat crops in parts of France, during the last, and some preceding years, have suffered so much from the ravages of this insect, (there called "*alucite des grains*,") that a prize has been offered for the discovery of means for checking them.

In general, the condition and prospects of farmers in Virginia were never better than now: and if there was no western country—no Texas—no distant region of which only the *good* is known, and the *ill* never heard of, until too late—which like the fabulous "happy islands," serve to make us first despise, and then abandon our blessings at home—there would be few countries which would yield more profit for cultivation, or be more susceptible of cheap, certain, and sure improvement.

NOTICES TO SUBSCRIBERS.

Remittances for subscriptions are often made, designated by mistake for a wrong volume. In some cases, the writers have supposed their previous payments to have reached a year beyond the fact—but more frequently, money has been sent to discharge the subscription for a volume already paid for, and forgotten by the subscriber. To avoid the trouble of two more letters being written for the correction of every such mistake, (as has often been done heretofore,) our future course will be to give no other notice than will appear from the regularly published receipt lists. Every subscriber who has sent a payment within the previous month, will find it there credited *for the volume or volumes, for which it should be, according to our account*. If any credit is found for a different volume from what was expected, the payer is requested to examine whether the error was in his own recollection, or in our account—and if the latter, to give immediate information, and the mistake will be promptly and readily corrected. Our own accounts, with every care used, cannot be kept entirely free from errors—but every facility is afforded for their detection, and early information for the purpose is always thankfully received. For information then of the existence of their own previous mistakes, as well as of any that we may hereafter be guilty of, all subscribers are again requested to look particularly to the statements of their payments on the receipt lists, and to give notice of all omissions, or improper insertions.

COLLECTING AGENTS.

Messrs. Robert and N. B. Hill of King William, are appointed collecting agents for this publication. This arrangement need not prevent any one, previously to being called on personally by an agent, making remittance by mail, as heretofore directed. It will necessarily sometimes happen that such application will be made after the subscriber has paid directly to the editor, and before there has been time for the receipt to be published on the next cover. In such cases, the subscriber's statement will be satisfactory to the agent—and it is hoped that the impossibility of preventing such occurrences, except by the appearance of their names on the printed receipt lists, will prevent any subscriber's taking offence at applications thus improperly made.

Credits for payments made to agents cannot appear promptly or regularly in the printed receipt lists—but will be placed there as soon and as often as made practicable by settlements between the publisher and agents. In the mean time, the agents' receipts will be held by those whose printed receipts are thus necessarily delayed.

Since the printing of the first half of this No. which included the remarks of T. B. A. and his inquiry for information respecting liming, we have received in the June No. of the *Annales de l'Agriculture Francaise*, the conclusion of a long communication on that subject, and can now present to our readers the translation, which we hope will be not only interesting but valuable to many. From this piece it appears that the most profitable application of lime, in France, is in compost, and in very small quantities, though repeated in every rotation.

TERMS OF THE FARMERS' REGISTER.

1. The Farmers' Register is published in monthly numbers, of 64 large octavo pages each, and neatly covered, at $5 a year—payable in advance.

2. Or five *new* subscribers by sending their names and $20 at one time to the editor, will receive their copies for one year, for that sum, or at $4 for each. Purchasers of any 5 volumes (except Vol. I.) at one time in like manner, shall have them for $20.

3. The risk of loss of payments for subscriptions, which have been properly committed to the mail, or to the hands of a postmaster, is assumed by the editor.

4. For all copies not received by mail, duplicates will be furnished to those subscribers who have complied with their own obligations.

5. If a subscription is not directed to be discontinued before the first number of the next volume has been published, it will be taken as a continuance for another year. Subscriptions must commence with the beginning of some one volume, and will not be taken for less than a year's publication.

6. The mutual obligations of the publisher and subscriber, for the year, are fully incurred as soon as the first number of the volume is issued: and after that time, no discontinuance of a subscription will be permitted. Nor will a subscription be discontinued for any earlier notice, while any thing thereon remains due, unless at the option of the editor.

THE FARMERS' REGISTER.

VOL. III. OCTOBER, 1835. No. 6.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

For the Farmers' Register.

INQUIRY INTO THE CAUSES OF THE FORMATION OF PRAIRIES, AND OF THE PECULIAR CONSTITUTION OF SOIL WHICH FAVORS OR PREVENTS THE DESTRUCTION OF THE GROWTH OF FORESTS.

By EDMUND RUFFIN.

Introductory Remarks.

The views which will be presented in the following pages are in part founded on others which were maintained, and are considered as established, in the *Essay on Calcareous Manures*—as, for example, the doctrine of the existence and causes of acid and still more of neutral soils—the chemical power of calcareous earth to combine with and to fix vegetable, or other putrescent matter, in soils—and that a certain proportion of lime, in some form, is essential to every productive soil, and without which ingredient the land would be barren, and incapable of being enriched. As the repetition here of the whole train of argument by which those doctrines were sustained, would be both unnecessary and improper, it may be permitted merely to refer to the work named, for these positions, as premises established, and either known, or accessible to every one who may feel interest in the further extension and consideration of the same general subject, which is here designed.

The necessity of making frequent reference to a previous and avowed work, and also the having elsewhere stated the general purport of this, will prohibit the writer from presenting this continuation anonymously; which otherwise would have been preferable, both on account of the writer's connection with the journal in which this will appear, and because the subject is one which will derive no support from its origin, being a matter of general argument resting on facts and authorities within the reach of every reader. But as these circumstances made it necessary that the piece should not be anonymous, for convenience, the ordinary form of a communication to the Farmers' Register has been adopted. Whatever of opposition to editorial usage may appear in these respects, it is hoped will be sufficiently accounted for, and held excused, by the existing circumstances. However confident the writer may be of the main positions which he will aim to establish in the following pages, he is sensible that he is venturing upon a new field of investigation, which is as yet unexplored—and indeed, almost untouched, except by those who have paid no attention to the problem to be solved, or of others who, with better lights of science, have fallen into gross and manifest errors and mistakes. Under such circumstances, he cannot expect to avoid being misled in many particulars; and he will be gratified at having such errors corrected, and the subject fully and properly treated by any other person possessing better means for receiving information, and pursuing this interesting subject of inquiry.

General and erroneous opinions respecting the growth or absence of trees on land in a state of nature.

There exists a wide-spread and strongly marked difference between the lands of different regions of the globe, in their being covered, or not, with trees, before being subjected to cultivation. But striking and strongly contrasted as are these different aspects of parts of the earth's surface, and much as each kind, when a novel scene, has drawn forth expressions of wonder and admiration from travellers, the causes have not been sought—indeed have scarcely attracted any attention. Yet, even if considered as a mere matter of curiosity, not likely to bring to light any thing of practical use, there is scarcely one of nature's riddles which would seem better calculated to interest philosophical, and especially agricultural investigators. These very different kinds of garb which are worn by different regions of the earth, extend over vast spaces, and of course are accompanied with many remarkable changes both of climate and soil. It follows that there are not many persons who have been accustomed to more than one of these conditions of the face of the earth, and those who have been, were not of the class the best qualified for investigating the subject. The first European settlers of North America were, by the contrast to their native lands, the more forcibly impressed by the magnificent forests of which there seemed to be no end, and no change, except from the greater abundance of one luxuriant and gigantic growth, to that of others. But this universal cover of the land, so different from any thing before known, was merely described with admiration by Europeans—no cause was sought for, or thought wanting; and they remained content with most erroneously attributing the luxuriant growth of trees to the fertility of the soil, and the want of the labors of tillage.*

*The words of the founder of Virginia, Capt. John Smith, show that the noble growth of trees which he and the other first European visiters found, gave them a very high and certainly mistaken opinion of the general fertility of Lower Virginia. "Within [the capes of Virginia,] is a countrey that may have the prerogative over the most pleasant places knowne, for large and pleasant navigable rivers: heaven and earth never agreed better to frame a place for man's habitation, were it fully manured and inhabited by industrious people. Here are mountains, hils, plaines, valleyes, rivers, and brookes, all running most pleasantly into a faire bay, compassed, but for the mouth, with fruitful and delightsome land."——"The vesture of the earth in most places doth manifestly proue the nature of the soyl to be lusty and very rich. The colour of the earth we found in diverse places, resembleth *bole Armoniac*, *terra a sigillata*, and *Lemnia*, fullers earth, marle, and divers and other such appearances. But generally for the most part it is a blacke sandy mould, and in some places a flat slimy clay, and in other places a very barren gravell. But the best ground is knowne by the vesture it beareth, as by the greatnesse of trees, or abundance of weeds, &c."———"Virgi-

The children of the early settlers grew up among forests, and they and their children, judging from all they saw, learned to consider that almost all soils, rich or poor, naturally would be covered by trees—and while falling into this error, at least got rid of that of their forefathers, in connecting the idea of a luxuriant forest growth with great fertility. When the spread of population finally brought the latter descendants to the borders of the Mississippi, and the great prairies of the west first opened to their astonished view, this change was as great as unaccountable, and yet the cause as little sought, as that of the universal forest state had been by the first emigrants from Europe. But ignorant wonder soon ceases, and leads to no profitable search for causes, or for truth. The children of the first settlers of the West have grown up among prairies; and when another century shall have passed, and our frontier settlements shall have reached the base of the Rocky Mountains, it may begin to be believed there, that the forest state is rarely known to nature, and is only produced by the labors and care of man. So the Bedouin Arab thinks the world is made of naked sand—and the Shetlander's world is of wet peat.

Of course these general remarks apply to those who are acquainted only with some one region of the world, and who have not been informed of others by books, any more than by travel. Among the more learned, there has been no lack of causes assigned for these opposite appearances—but they are such as to show a strange disregard of all the requisites of sound reasoning, and of accurate investigation. Any reason that was first advanced, however insufficient, however absurd, seems to have been readily admitted, and to have passed current from one traveller, or writer, to another. Thus, to the annual fires alone has been attributed the destruction of trees, and the formation of the great prairies of the west; and this cause has been deemed sufficient by both the learned and the ignorant. The objection to it is, that all the Atlantic slope was burned over as often as the west, before the settlement of the country, and in the former (at least east of the mountains) not one acre of prairie had been produced.

Philosophical writers have maintained supposed causes of the destruction of the forests which formerly covered England, which are very plausible when considered alone: but precisely similar causes have been operating long and generally in this country, and our forests not only do not decay and die, but continue to defy every agent of injury, except the thorough use of the axe and plough. Even where long continued tillage has the most effectually eradicated the natural and original forest growth, if the impoverished land is merely let alone for thirty years, it will (in most cases,) be better covered with a new growth of trees, than the utmost care could raise in England. Examples of the facts and reasoning referred to are presented in the following passage from Davy.—"In instances where successive generations of vegetables have grown upon a soil, unless part of their produce has been carried off by man, or consumed by animals, the vegetable matter increases in such a proportion, that the soil approaches to a peat in its nature: and if in a situation where it can receive water from a higher district, it becomes spongy, and permeated with that fluid, and is gradually rendered incapable of supporting the nobler classes of vegetables.

"Many peat-mosses seem to have been formed by the destruction of forests, in consequence of the imprudent use of the hatchet by the early cultivators of the country in which they exist: when the trees are felled in the out-skirts of the wood, those in the interior are exposed to the influence of the winds; and having been accustomed to shelter, become unhealthy, and die in their new situation, and their leaves and branches gradually decomposing, produce a stratum of vegetable matter. In many of the great bogs in Ireland and Scotland, the larger trees that are found in the out-skirts of them, bear the marks of having been felled. In the interior, few entire trees are found; and the cause is, probably, that they fell by gradual decay; and that the fermentation and decomposition of the vegetable matter was most rapid where it was in the greatest quantity."—[*Lec. 4.*] In Virginia no one forest tree has been known to die, or even to decline, from being exposed in the manner above described as so fatal: and such effects being produced in England would only prove that the soil was unfavorable to trees, and their life therefore feeble and sickly, and ready to yield to any new and considerable cause of injury.

The entire absence of trees for 900 miles across the Pampas between Buenos Ayres and the Andes, has been still more absurdly attributed to the winds (called *pamperos*) which often sweep across those wide plains with such violence, that no trees could withstand their power. I have seen in our forests where a hurricane had uprooted or broken off every tree of size in its course. But no wind could destroy the young and flexible underwood—and if such winds swept the same track every year, or every month, they would not prevent it being thickly covered with young sapling trees.

The downs in England, which have not been tilled for hundreds of years, and are only valuable for sheep pasture, show no rising growth of trees. This is not held strange there, but would be supposed sufficiently accounted for by the poverty of the soil, and the (supposed) impossibility of young

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nia doth afford many excellent vegetables, and living creatures, yet grasse there is little or none, but what groweth in low marishes: for all the countrey is overgrowne with trees, whose droppings continually turneth their grasse to weeds, by reason of the ranckness of the ground, which would soone be amended by good husbandry. The wood that is most common is oke and walnut, many of their okes are so tall and straight that they will beare two foote and a halfe square of good timber for 20 yards long."—(*Second Booke of the Tree Travels, Adventures, and Observations of Captaine Iohn Smith, &c. London,* 1629.) Captain Smith was altogether unskilled in agriculture, and it may be presumed that when he spoke of the need of such rich land being "fully manured," as well as inhabited, he meant nothing more than that it should be properly cultivated—of which, manuring was deemed a general and necessary part. But this accidental (and according to his views, erroneous) expression, was much nearer the truth than the opinion of fertility being proved by the "greatnesse of trees;" for much the greater part of the land bearing the largest and most magnificent growth of oaks, pines, and other common trees, was in truth poor then, and will ever remain so, without the application of calcareous matter.

trees growing, even if planted, on open pasture land, without any care, and where they were always exposed to the attacks of live stock. But in Virginia, no degree of poverty, no exposure to grazing, will prevent untilled land growing up in wood. Annual fires, grazing animals, and poverty, wetness or sandiness of soil, all may prevent the growth of trees, as alledged in different countries: but all these are but secondary causes which would have little or no effect, without the more powerful operation of some other, and primary cause. *This cause will be found in the peculiar constitution of the soil*—and I will proceed to state my reasons for believing that the cause of the different conditions of land as to being naturally covered with trees, or not, in general is merely *the deficiency of lime in the soil, or its abundance*—the former state being friendly to forest growth, and the latter being as unfriendly. Or, in terms so general as to cover all the exceptions which will hereafter be admitted to the foregoing position—it may be stated, that the formation of prairies, &c. is caused by *the existence of such circumstances as favor the growth of grass in a far greater degree than the growth of trees*—and of all such circumstances, the abundance of calcareous matter in the soil is the most efficient.

In addressing readers residing in, or otherwise well acquainted with the Atlantic states, it is unnecessary to adduce facts to prove the general and strong disposition of the soil to produce trees, in vigor and luxuriance—to resist the labors of man for their destruction—and to return to the state of forest whenever tillage is intermitted. No untilled land will long remain naked, or in grass; and even under a regular rotation of crops, the labor of grubbing to destroy young trees is continually required on most lands, and particularly on those originally of inferior quality. Our poorest lands in lower Virginia, are generally covered with young pines in four or five years after being left without tillage, and their after growth is as rapid and heavy as European timber growers would expect on the best lands, and with every care bestowed for that end. But it is not only to pines, (though that is the most striking case,) that this applies. In the higher and stiffer lands, where pines are rare, the springing of other young trees shows the same general tendency of the soil. If this tendency can be said to be feeble any where in lower Virginia (and it may be presumed that the same state of things exists in all the Atlantic states,) it is on the few naturally rich soils on the rivers, some of which are the only lands naturally calcareous in the country—and all of which derived their natural fertility and permanent value, from possessing lime in some form as an ingredient. In the Essay on Calcareous Manures proofs have been exhibited of this supposed quality of such lands*—and therefore they will not be repeated here. It has also been maintained in the same work, and the proofs exhibited at length, that in Virginia and the Atlantic states generally, there are few soils containing naturally any portion whatever of *carbonate of lime*—and all the vast region which is so peculiarly constituted, in being destitute of this ingredient, is precisely that which so strongly favors the growth of trees.

Over all this great extent of country, we may suppose that the aboriginal inhabitants sent fires every year to aid their hunting. Indeed it would have been scarcely possible to avoid it, when almost the whole country was under one great forest, and the entire surface covered with dry leaves. For more than a century after the settlement of the present race of civilized inhabitants, fires passed over the woodland almost every spring—caused either by the carelessness or design of hunters, or by the farmers to forward the growth of grass for their cattle. It required legal prohibitions, added to the general extension of tillage, and the great damage of burning fences, &c. to put a stop to this practice of burning the woods. Even in these latter times we hear of fires of tremendous fury sweeping hundreds of square miles in Maine, destroying timber, and every combustible matter on the few small farms in this yet wild region. Yet no where below the mountains, nor in any poor region, has the wood growth been destroyed—nor has an acre of prairie been thus formed, whether on land rich or poor. This is enough to prove that no violence or frequency of fires can destroy and keep down the growth of trees, unless aided by some other and more efficient agent.

The most general cause of the absence of trees.

The next position that will be assumed is, that most of the prairies, pampas, steppes and downs, which are bare of wood, though never tilled, are highly calcareous, and therefore unfriendly to the growth of trees.

The proofs necessary to maintain such wide ground, directly and absolutely, would require more of time, and labor of investigation, than the labors and life of any one individual would suffice for: therefore the facts that will be offered are only considered as specimens of the thousands which the world could furnish, and to be taken as fair samples of all, only while they remain uncontradicted by other opposing facts. No traveller having (to my knowledge) sought to learn or to report any particular information as to the constitution of such soils, or having attached any importance to the presence or absence of calcareous ingredients, I have only been able to gather indirectly from their observations, the scattered testimony which will be adduced. Unfortunately no traveller has been a scientific agriculturist: and though many have been mineralogists, geologists, or chemists, they have given no attention to the constitution of the soils over which they passed, nor did any seem to consider that the composition of the soil had any bearing on its strange external features, which were the theme of their admiration. Dr. Clarke, distinguished as he deservedly was as a man of science, has told as little of the nature of the soil of the Russian steppes, as most of the least uninformed of the observers of our prairies.

Proofs—derived from the general description of prairies, pampas, steppes, &c.

Before entering more upon particulars, in addressing readers who are generally (like the writer) accustomed only to soils favorable to trees, it is proper to describe generally the features of the great regions which are bare of such growth, and which, under the different names of *prairies, bar-*

*Page 17, 2nd Edition.—On neutral soils.

rens, and *savannahs*, in North America, *pampas* in South America, and *steppes* in Russia and Tartary, form a very large portion of those parts of the globe. All of these with various grades of fertility, and many points of difference in other respects, agree in being, or having been at some time when in a state of nature, bare of trees, or nearly so, and in being clothed with grass of greater or less luxuriance.

The word "prairie" was first applied by the French colonists, and means in their language, a *meadow*. The name therefore plainly enough designated all land covered only with grass. The name of "barrens" so strangely applied in Kentucky to very rich lands, of this kind, was owing to the resemblance of the dry grass on these lands to the broom grass which covers and grows luxuriantly on the naturally poor soils of Lower Virginia, when left out of cultivation. This resemblance caused the surveyors who were sent to lay off the Virginia military lands, to reject these as barren soil, and the term then so erroneously applied to an extensive region, has still continued to be used, and even has been extended to similar lands elsewhere.

It will be most sure and satisfactory to use the language of the writers who have seen and described these regions, rather than to attempt a more general and condensed description, at the risk of changing the purport of their expressions. None of these writers, nor any that I have been able to consult, give any direct and positive testimony derived from analysis, as to the soil being supplied, or not, with calcareous ingredients. It is only from incidental observations of the nature of the rocky subsoil, the kinds of grass, &c. that any information of this kind has been indirectly gathered. All that can be said is, that such testimony, so far as it goes, is in favor of the calcareous composition of such soils generally. Such expressions as most strongly (though indirectly) support my views of the constitution of prairie soils, or show a resemblance of one of these regions to some other better known, will be put in italics.

The first extracts will be from the *Views of Louisiana*, by H. M. Breckenridge, a writer intimately acquainted with the western country, and who describes what he had travelled over and seen. The Louisiana of which this work treats includes not only the state as now bounded, but all the vast region lying west of the Mississippi, formerly held under that general name by the French and Spanish governments.

"This extensive portion of North America, has usually been described from the inconsiderable part which is occupied by the settlements, as though it were confined to the immediate borders of the Mississippi, as Egypt is to those of the Nile. By some, it is represented in general description, as a low, flat region, abounding in swamps and subject to inundation; which is the same thing as if the Netherlands should furnish a description for all the rest of Europe. Others speak of Louisiana as one vast forest or wilderness:

"Missouri marches through his world of woods."

which is far from being the case, for excepting on the banks of this river, and that not more than one-half its course, the country through which it passes, is deplorably deficient in woods. If then, we are to describe Louisiana, not from a small district, important because already the seat of population, but from the appearance of the whole, combined in a general view, we should say, that it is an extensive region of open plains and meadows, *interspersed with bare untillable hills*, and with the exception of some fertile tracts in the vicinity of the great rivers by which it is traversed, resembling the grassy steppes of Tartary or the Saharas of Africa, but without the numerous morasses and dull uniformity of the one, or the dreary sterility of the other. The fertile tracts are chiefly to be found, in the narrow vallies of the great rivers Missouri, Mississippi, Arkansas, Red River, and some of their principal tributaries; the two largest bodies of fertile soil are the delta of the Mississippi, which is much interspersed with lakes, marshes, and sunken lands, that will require ages to reclaim, and the territory of the Missouri, as limited by the boundaries lately agreed on with the Indians, which bears a strong resemblance to the West Tennessee in some of its features."—pp. 66, 67.

"A remarkable feature in this western side of the great valley [of the Mississipi,] is its deficiency of wood, while the opposite, (with the exception of some parts on the north side of the Ohio, where the woods have been burnt;) is a close and deep forest. The woods continue for a short distance up the Mississippi before they disappear, and the grassy plains begin. The banks of the Missouri are clothed with luxuriant forest trees for three or four hundred miles, after which, they gradually become bare, and the trees diminish in size; at first we find thin groves of the kind of poplar called cotton wood, but of a diminutive growth, intermixed with willows; next the same tree, reduced to half its height, and resembling an orchard tree; after this, a thin border of shrubbery is almost the only ornament of the margin of the river. The same thing may be said of the Arkansas and Red River.

"Taking the distance to the muntains to be about nine hudred miles, of the first two hundred, the larger proportion on the Missouri and its waters, is well adapted to agricultural settlements, its soil and conveniences are equal if not superior to those of Tennessee or Illinois; this tract will include the greater part of the White and Osage rivers, the lower Missouri, and for at least one hundred and fifty miles north of this last river. The proportion of wood gradually lessens to the west, and still more to the north, with the addition that the lands become of an inferior quality. For the next three hundred miles, the country will scarcely admit of compact settlements of any great extent; the wooded parts, form trifling exceptions to its general surface, and are never met with but on the margin of the rivers. We may safely lay it down, that after the first two hundred miles, no trees are found on the uplands, save stinted pines or cedars; the rest of the country consists of open plains of vast magnitude, stretching beyond the boundary of the eye, and chequered by numerous waving ridges, which enable the traveller, to see his long wearisome journey of several days before him. Yet, it does not seem to me, that the soil of this tract, is any where absolutely unproductive; it is uniformly covered with herbage, though not long and luxuriant like that of the plants nearer the centre of the valley: it is short and close, but more nutricious to the wild herds, than the coarse grass of the common prairie. This tract, has not the dreary barrenness described by Johnson in his tour to the Hebrides; the green carpet which covers, and the beautiful shrubberies which adorn it, afford relief to the eye. But again, it is very doubtful whether trees could be cultivated; for I observed that *the trees which by accident are permitted to grow, are but dwarfs;* the oak for instance, is not larger than an orchard tree, the plumb is nothing more than a shrub, in some places not exceeding a currant bush. There are, however, scattered over the immense waste, a number of spots which greatly surpass in beauty any thing I have ever seen to the east of the Mississippi. But there are others again, barren in the extreme, producing nothing in the best soil but hysop and the prickly pear."—pp. 69, 71.

"Thus it appears, that with the exception of a belt of one hundred and fifty, or two hundred miles in width, at most, stretching from the Missouri, in a line parallel with the course of the Mississippi, across the Arkansas and Red River to the Sabine, about twice the territory of New York, but not a tenth part of the western section of the valley, the province of Louisiana is little better than a barren waste, and that the eastern side will always contain a much greater population."—p. 72.

"This western region, it is certain, can never become agricultural; but it is in many respects highly favorable for the multiplication of flocks and herds. These delightful spots where the beauty and variety of the landscape, might challenge the fancy of the poet, invite to the pastorial life. How admirably adapted to the interesting little animal the sheep, are those clean smooth meadows, of a surface so infinitely varied by hill and dale, covered with a short sweet grass, intermixed with thousands of the most beautiful flowers, undeformed by a single weed.

"I confess, that to me, nature never wore an aspect so lovely as on the lonely plains of the west. From their dry and unsheltered surface, no damp and unwholesome vapors rise to lessen the elasticity of the air, or dim the brilliant blue of the heavens. So transparent is the atmosphere, that a slight smoke can be discerned at the distance of many miles, which curiously exercises the caution and sagacity of the fearful savage, ever on the watch to destroy, or to avoid destruction. And then, that sublime immensity which surrounds us; the sea in motion is a sublime object, but not to be compared to the varied scenes which here present themselves, and over which the body as well as the imagination, is free to expatiate. The beams of the sun, appeared to me, to have less fierceness, or perhaps this might be owing to the cool breezes which continually fan the air, bringing upon their wings the odors of millions of flowers. The mind appears to receive a proportionate elevation, when we are thus lifted up so much higher than the centre of the valley. There was to me something like the fables of fairy land, in passing over a country where for hundreds of miles I saw no inhabitants but the buffaloe, deer, the elk, and antelope: I have called it the paradise of hunters, for to them it is indeed a paradise. There are, however, some important drawbacks on the advantages of this country, even considered as a pastoral district. To the north of the Missouri, rains are extremely rare, but when they are set in, pour down in torrents, while to the south their place is chiefly supplied by heavy dews. In the dry season, which is from the month of June until the latter end of September, at a distance from the great rivers, *water is every where exceedingly scarce.* The buffaloe at this time, leaves the plain and seeks the rivers, and the Indians in their excursions to any considerable distance, are obliged to shape their courses by some known pond, and to carry besides a quantity of water in bladders. It is possible, that wells might be sunk, but it is certain, that at this season *one may travel for days without finding a drop of water;* one may frequently pass the beds of large rivers which have disappeared in the sands, but after rains, or on the melting of the snows, unpassable torrents are seen to fill their channels, and to roll down in turbid and frightful floods."—pp. 73, 75.

"The tract of country north of the Missouri, is less hilly than that on the south, but there is much greater proportion of prairie. It has a waving surface, varied by those dividing ridges of streams, which in Kentucky, are called *knobs.* These prairies, it is well known, are caused by repeated and desolating fires, and the soil is extremely fertile.

"The plains of Indiana and Illinois have been mostly produced by the same cause. They are very different from the savannahs on the sea board, and the immense plains of the Upper Missouri. In the prairies of Indiana, I have been assured that the woods in places have been known to recede, and in others to increase, within the recollection of the old inhabitants. In moist places, the woods are still standing, the fire meeting there with obstruction. Trees, if planted in these prairies, would doubtless grow. In the islands, preserved by accidental causes, the progress of the fire can be traced: the first burning would only scorch the outer bark of the tree; this would render it more susceptible to the next, and the third would completely kill. I have seen in places, at present completely prairie, pieces of burnt trees, proving that the prairie had been caused by fire. The grass is usually very luxuriant, which is not the case in the plains of the Missouri. There may doubtless be spots where the proportion of salts, or other bodies, may be such, as to favor the growth of grass only.

"Such woods as remain are fine, but the quantity of adjoining prairie is usually too great. There are large tracts, however, admirably suited for settlements: a thousand acres or more of wood land, surrounded by as much of prairie. It is generally well watered with fine streams, and also interspersed with lakes. There is an extensive strip of land along this side of the Missouri, of nearly thirty miles in width, and about one hundred and fifty in length, altogether woods, and of excellent soil. An old gentleman who has seen Kentucky a wilderness, informed me, that the appearance of this tract is similar, with the exception of its not being covered with cane, and a forest so dark and heavy. The "Forks of the Missouri," (such is the name given to the northern angle, formed by the two great rivers,) daily increases in reputation, and is settling faster than any part of the territory.

"The Missouri bottoms, alternately appearing on one side or other of the river, we have already seen, are very fine for three hundred miles up, generally covered with heavy timber; the greatest part of which is cotton wood of enormous size. The bottoms are usually about two miles in width, and entirely free from inundation. The bottoms of the Mississippi are equally extensive and rich, but not so well wooded. They are in fact a continued succession of the most beautiful prairies or meadows. The tract called *Les Mamelles*, from the circumstance of several mounds, bearing the appearance of art, projecting from the bluff some distance into the plain, may be worth describing as a specimen. It is about three miles from St. Charles; I visited it last summer. To those who have never seen any of these prairies, it is very difficult to convey any just idea of them. Perhaps the comparison to the smooth green sea, is the best. Ascending the mounds, I was elevated about one hundred feet above the plain; I had a view of an immense plain below, and a distant prospect of hills. Every sense was delighted, and every faculty awakened. After gazing for an hour, I still continued to experience an unsatiated delight, in contemplating the rich and magnificent scene. To the right, the Missouri is concealed by a wood of no great width, extending to the Mississippi, the distance of ten miles. Before me, I could mark the course of the latter river, its banks without even a fringe of wood; on the other side, the hills of the Illinois, *faced with limestone*, in bold masses of various hues, and the summits crowned with trees: pursuing these hills to the north, we see, at the distance of twenty miles, where the Illinois separates them, in his course to the Mississippi. To the left, we behold the ocean of prairie, with islets at intervals. The whole extent perfectly level, covered with long waving grass, and at every moment changing color, from the shadows cast by the passing clouds. In some places there stands a solitary tree of cotton wood or walnut, of enormous size, but from the distance, diminished to a shrub. A hundred thousand acres of the finest land are under the eye at once, and yet on all this space, there is but one little cultivated spot to be seen."—pp. 204,206.

"————Nothing else was visible—not a deer, not a tree—all was prairie—a wide unbroken sea of green—where hollow succeeded hollow, and the long grass waved on the hills with a heavy surf-like motion, until at last it was blended with the hazy atmosphere, which met the horizon. The power of sight was shut out by nothing; it had its full scope, and we gazed around until our eyes ached with the very vastness of the view that lay before them. There was a degree of pain, of loneliness, in the scene. A tree would have been a companion, a friend. It would have taken away the very desolation which hung round us, and would have thrown an air of sociability over the face of nature; but there were none. The annual fires which sweep over the whole face of the country during the autumn of every year, effectually destroy every thing of the kind. There will be no forest as long as the Indians possess these regions; for every year, when the season of hunting arrives, they set fire to the long dry grass. Once fairly on its errand, the destructive messenger speeds onward, licking up every blade and every bush; until some strip of timber, whose tall trees protect the shrubbery, by the dampness which they diffuse beneath, or some stream, stops it in its desolating path.

"The object of burning the grass is to drive the deer and elk that are raving over the broad extent of the prairies, into the small groves of timber scattered over the surface. Once enclosed within these thickets, they fall an easy prey to the hunters."—*Irving's Indian Sketches*, 1835.

The next extracts are from an article in Silliman's Journal, by W. W. McGuire, on the prairies of Alabama.

"In speaking of the prairies, the rock formation claims particular attention. It is *uniformly found below the prairie soil*, at various depths, ranging from ten to fifteen feet, and it sometimes projects above the ground. This rock is generally known by the name of *rotten limestone;* when removed for several feet on the top, and exposed to the action of the atmosphere for some time, it assumes a beautiful white color. In its soft state it is easily quarried, and blocks of almost any dimensions can be procured. It has been dressed by planes and other instruments, and used in building chimneys, some of which have stood twelve or fifteen years without injury or decay. A summer's seasoning is requisite to fit it for building. This rock has been penetrated by boring to depths varying from one hundred to five hundred and fifty feet; after the first six or seven feet, it is of a bluish or gray color, but still soft except in a few instances, where flint strata of a foot thick or more have been met with. On perforating the rock, a full supply of good water is always obtained, which uniformly flows over the top. I have heard of no constant running stream of water over this rock, except one in Pickens county, near the lower line. The superincumbent earth is for a few feet composed principally of stiff clay, of whiteish color; then comes the mould of soil, which is very black—in wet weather it is extremely miry and stiff, and in dry, very hard and compact.

"*Shells, such as the oyster, muscle, periwinkle, and some other kinds, are found in great quantities throughout almost all the prairies of Alabama and Mississippi;* the first named being the most numerous, mixed in every proportion with the others. The oyster shells are perfectly similar to those now obtained from the oyster banks on the shores of the Atlantic. The largest beds of shells in the open prairies seem to occupy rather elevated but not the highest places. They have probably been removed from the more elevated situations by torrents of rain. It may be that the lowest places never contained any shells; or if they did, as vegetable matter accumulates in greater quantities in low situations, they may have been thus covered. In some instances I believe they have been found in such places, several feet below the surface. They are not found in very large quantities in the timbered prairies; and indeed, so far as I have observed, wherever the shells are numerous, vegetation is not so luxuriant as where there is a proper admixture of the decomposed or decomposing shells and vegetable matter.

"These shells and other decomposing materials appear to have given a peculiar character to the prairie soil, which causes it to adhere so strongly to the legs of horses and to the wheels of carriages as to remain several days in travelling, unless washed or beaten off. Yet, when well broken up, at the proper season, and regularly ploughed, it remains quite mellow, producing corn and cotton equal to the best alluvial bottoms, with, so far as it has been tried, increased fertility; although from the compact nature of the rock beneath, and the tenacity with which it retains moisture, crops are injured sometimes by rains, but seldom by drought.

"There being no opening or fissures, except above the rock, by which to convey the water directly to the channel of creeks and rivers, there are consequently *no reservoirs to contain supplies for fountains and springs.* In the winter and spring seasons the streams overflow and the land is literally submerged. In the summer and autumn *neither springs or wells are to be found,* except below the rock; yet notwithstanding this scarcity of water, there is seldom a lack of moisture for the purpose of vegetation. And at times when the drought is such as to produce fissures two or three inches wide and as many feet deep, *the earth will be found quite moist at the depth of two or three inches.*"

"There are open prairies of every size from one hundred to one thousand or twelve hundred acres, mixed and interspersed in every form and mode with timbered land of all kinds; some producing only black-jack and post oak, not exceeding fifteen or twenty feet in height; others again covered with the most majestic oak, poplar, elm, hickory, walnut, pacaun, hackberry, grapevine and cane, equal in size and beauty, I understand, to similar kinds in the Mississippi alluvions.

"The extent of this country may not be unimportant. I am informed that traces of prairie soil may be seen in Georgia, perhaps as far east as Milledgeville. It is indeed said to exist in North Carolina; but of this I have not evidence such as to warrant the assertion. That it stretches nearly five hundred miles eastward from the vicinity of the Mississippi on the west almost to Milledgeville, there is no doubt; and if it extends, as is said to be the fact, to North Carolina, it reaches four hundred or five hundred miles farther, being perhaps nine hundred or one thousand miles long, and from forty to sixty in breadth."

In addition to the foregoing extracts, several communications to the Farmers' Register, (which are before its readers,) confirm these statements, and (independent of the aid of chemical analysis, which will be referred to hereafter,) show that the prairie soils of Alabama generally are intermixed with calcareous earth, and universally underlaid with that substance in a much more pure form, yet soft enough to be penetrated by roots.* The letter of N. D. Smith, Esq. in the last No. gives a like account of the underlying stratum of the prairies of Arkansas. Such is also the account of Mr. Featherstonhaugh in his geological report of that region—and in addition to the calcareous character of the underlying soft rock, he speaks (though not in very definite terms) of the black rich soil above, as being "substantially calcareous."† Another similar fact in a remote locality, has recently been published. A tract of prairie land in the northwest part of Pennsylvania, lies on calcareous earth so pure as to be converted, by being burnt, to lime of the best quality. This earth reaches to within a foot of the surface.*

The next extracts present sufficient ground for considering the steppes and prairies as belonging to the same class.

"In all parts of the river [Don] above Kasankaia, *it seems to flow over a bed of chalk;* and its banks, gently swelling upwards from the water, rise like the South Downs of Sussex; *often disclosing the chalk, of which they consist.* Farther down, and near the water's edge low copses of wood almost always accompany its course; but they diminish as it draws nearer to Tscherchaskoy, the inhabitants of which town derive all their wood from the Volga.

"As soon as we left Kasankaia, we entered the *steppes* in good earnest, with a view to traverse their whole extent to Tscherchaskoy. These are not cultivated; yet, bleak and desolate as their appearance during winter must be, they have in summer the aspect of a wild continued meadow. The herbage rises as high as the knee, full of flowers, and exhibiting a most interesting collection of plants. No one collects or cuts this herbage. The soil, though neglected, is very fine. We passed some oaks in the first part of our journey, which had the largest leaves I ever saw."—*Clark's Travels in Russia, p.* 189.

"Leaving this encampment, we continued traversing the *steppes* in a southwesterly direction, and passed a very neat village belonging to a rich Greek, who, to our great surprise, had established a residence in the midst of these desolate plains. As we advanced, we perceived that wherever rivers intersect the *steppes,* there are villages, and plenty of inhabitants. A manuscript map at Tscherchaskoy confirmed the truth of this observation. No maps have been hitherto published in Europe which give an accurate notion of the country. A stranger crossing the Cossack territory, might suppose himself in a desert, and yet be in the midst of villages. The road, it is true, does not often disclose them; but frequently, when we were crossing a river, and believed ourselves in the midst of the most uninhabited country, which might be compared to a boundless meadow, we beheld villages to the right and left of us, concealed, by the depth of the banks of the river, below the level of the plain; not a single house or church of which would have been otherwise discerned."—p. 198.

"From Acenovkaia, we continued our route over *steppes* apparently destitute of any habitation. Dromedaries were feeding, as if sole tenants of these wide pastures."—p. 199.

Dr. Clarke, though traversing a vast extent of steppes, says very little more of them than is presented in the short quotations above. They give a clear though indirect indication of their chalky formation, and similarity to the *downs* of Sussex in England. Yet the author seems to have attached no importance to these facts, nor does he take any other notice, direct or indirect, of the nature, or chemical composition of the soil. Yet, in

*See Farm. Reg. pp. 276, 277, 367, of Vol. I.—and pp. 637, 716, 717, Vol. II, and pp. 65, 66, Essay on Calcareous Manures.

†See extract from the report at page 147, Vol. III. Farm. Reg.

*See Farmers' Register, page 169, Vol. III.

addition to his scientific attainments as a chemist and mineralogist, his botanical knowledge, if properly applied, would have thrown much light on this subject. I have no doubt but hereafter the character of soils, as to possessing calcareous matter abundantly, or being destitute of that ingredient, will be determined with certainty by the presence or absence of many different plants. Dr. Clarke gives a catalogue of many of the plants observed in his journey, and of them a few are stated to have been found on the steppes. These are copied below,* that others who have some knowledge of botany, may be able to state whether these plants are confined to calcareous soils or not. If the author had stated that sheep sorrel was a common growth of the steppes, I would at once admit, from that solitary fact, that the soil must be destitute of calcareous earth. In like manner, if the soil is highly calcareous, some of the plants which he observed there, or which may be found on the prairies, would afford as certain proof of that fact, as the presence of sorrel would of the reverse. These suggestions are thrown out for the consideration of investigators who have the knowledge and opportunities requisite to put them to use. It is a new field for botanists, which promises a sure and valuable harvest.

The next extracts which are from Tooke's *View of the Russian Empire*, will give more full information of the steppes.

"*Arable Land.*—Under this head we must reckon various tracts of land, especially, 1. Those that are kept in constant cultivation and tillage, such as are every where seen in Great and Little Russia, in the provinces bordering on the Baltic, and many others. 2. Such as are only used at times, and left quiet for a great length of time. In some regions, for instance, in Little Russia, about the Don,† &c. where they are looked upon as steppes, which if merely ploughed and then sown, would be productive; in others, for example, in Livonia, Esthonia, and Ingria, where they are rendered fertile by fire, and are called by the countrymen bush-lands.‡ On such parcels of ground, which are either allotted into particular possesions, or without a proper owner, villages might be gradually erected. In uninhabited districts these tracts are most frequent. 3. Those that are proper for agriculture, but lie totally unemployed: they wait only for industrious hands. There are still plenty of these vast tracts, where millions of men might find work and profit, especially in fruitful steppes, and in numberless large forests.

"The fertility of all these tracts is very different according to the quality of the soil. In Livonia and Esthonia, from good fields they reap 8, and in successful years from 10 to 12 fold; from indifferent ground about only 3, but from better, at times 16 or even more than 20 fold. The harvests about the Don are commonly 10 fold; but towards Tomsk on the Tshumush, and in the whole region between the Oby and the Tom, many fields afford an increase of 25 to 30 fold;* and at Krasnoyarsk the failure of a crop was never heard of: of winter corn they reap 8, of barley 12, and of oats 20 fold.†

"In Little Russia, on the Don, and in many other places, the fields are never manured, only ploughed once, just to turn up the earth, afterwards harrowed, and then sown: more culture, especially dunging, would push the corn up too luxuriantly or parch it, and so hurt the harvest, as the soil is sufficiently fertile of itself. Of equal goodness is the ground in great part of Siberia: for example, on the Samara, on the Ufa in the country of the Bashkirs; here and there in the Baraba, or the Barabinian steppe; also on the Kama, whence a great quantity of corn is sent to the northern cornless dwelling-places on the Dvina and Petshora. In like manner too in the government of Isetsk the soil generally consists of a black earth to the depth of an ell, consequently is proper for tillage, for meadow-land, and garden ground. On the Oby near Barnaul, the black earth does not indeed go very deep, *but the marly clay‡ that lies under it, fertilizes it so much* as to make it, in some places, yield plentiful harvests, without manuring, for twenty years successively.§ At Krasnoyarsk, the fields will bear no manure whatever, and yet continue fruitful for 10 or 15 years, if only suffered to lie fallow every third year.‖ When the fertility ceases, the boor takes a fresh piece from the steppe. On the Selenga, in the district of Selenghinsk, the fields are hilly, and yet will bear no manure, as it is found on repeated trials to spoil the corn."¶

Speaking of the meadow land, the same author says—

"Some steppes produce the best meadow-grass for provender, and yield seed for making artificial meadows; such as the *esparcette* the alpine hedysarium, *clover*, various kinds of artemisia, pulse, starflower plants,** and fine grasses that will bear any climate.

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*"*Centaurea Frigida*, northern knap weed—on the steppes." "*Centaurea Radiata*, rayed knap weed—on the steppes near Koslof. The sheep feed on it in winter, and it is supposed to give them that gray wool so much valued by the Tartars." "*Crocus Sativus*, autumnal meadow-saffron—steppes near Achmetchet." "*Geranium Sylvaticum*, wood crane's bill—steppes." "*Silene Quadrifida*, four-cleft catch-fly—steppes, near Perecop," "*Sisymbrium Loeselii*, Loesel's hedge-mustard—steppes near Perecop." "*Statice Trigona*, three-sided lavender—in the steppes, very frequent." "*Vescia Pannonica*, Pannonian vetch—steppes.; "*Stipa Pennata*—in all the steppes." Many other plants are named in different parts of the work, as found in the region of steppes, but it is not certain that they were always from such soil, and therefore are not added to this list.

† The Don Kozak takes, in whatever part of the steppe he chooses, a piece fit for cultivation, and, bestows his labor upon it as long as he thinks proper or as long as its visible fertility will amply reward his labor.

‡ See Hupel Liefl. and Esthl. vol. ii.

* Pallas, vol. ii. p. 650 & seq.

† Ibid. vol. iii. p. 6.

‡ A dark-gray earth, about a foot deep, beneath which runs a layer of clay, and is held in many places to be fine arable land.

§ Pallas, vol. ii. p. 641.

‖ Ibid. vol. iii. p. 6.

¶ Ibid. p. 168.

** Ibid vol. ii. p. 75.

There was good reason to believe that other plants mentioned as growing on these lands, as clover, vetches, &c. indicated a calcareous soil—but here is one mentioned, which alone is a positive and sufficient proof. *Esparcette*, which is stated as one of the natural grasses of some of the steppes, is the French name of sainfoin—and the fact of its growth, alone, proves as well as any chemical analysis could, that all the soils bearing it are highly calcareous. Sainfoin not only delights in calcareous soils, but it will scarcely live, and cannot thrive, on any other. It is a valuable grass on chalk soils in England, which would be almost barren under grain tillage; and it has never been raised in Virginia, and indeed will scarcely produce a few feeble and scattering stalks on our best lands. The bald and least productive prairies of our western country would be the proper place for this grass.

"All the meadows may be reduced to these four kinds: 1. Fine productive meads that have a good black, but somewhat moist soil: these yield the greatest crops, of hay; to them belong the luchten [overflowed land.] 2. Dry, whereof the soil is fit for agriculture, and at times is so employed; they commonly yield a short but very nutritious hay. 3. Watery and marshy; these do not produce the best, but give a very serviceable hay in cases of scarcity in parching summers and dry places. 4. Fat steppes, where the grass in some parts grows to the height of a man: they are seldom mown."

"*Steppes.*—This term does not properly denote low and watery places, or morasses, but dry, elevated, extensive, and for the most part uninhabited plains. Some of them being destitute of wood and water, are therefore uninhabitable; others have shrubs growing on them, and are watered by streams, at least have springs or wells, though they are void of inhabitants; yet in these, nomadic people wander about with their herds and flocks, and thus make them, if not their constant, yet their summer residence. In many of them are seen villages. Some occupy a very large space: thus it is calculated that the steppe between Samara and the town of Uralsk* amounts in length to upwards of 700 versts; but, as every twenty or thirty versts we come to a lake or river, the Ural-kozaks traverse them when they fetch their meal from Samara. Probably hereafter several of these steppes, at least in some places, will be cultivated, if they wish to raise forests upon them.

"In regard to the soil an extreme variety prevails, either being very fruitful and proper for agriculture or for meadow-land, or indiscriminately for both. Accordingly in the steppe about the Don, the Kozaks of those parts employ themselves in agriculture, as well as in the breeding of cattle. Some of them furnish excellent pasture by their fine herbage, as the southern tract of the Isetskoi province, and the steppe of the middle horde of the Kirghistzi.† Or the soil is unfruitful: whether it be the sand, the salt, or the stone it contains that is the cause of it. Among these are to be reckoned the sandy steppe on the Irtish near Omsk; in general we find about the mountains up the Irtish pure arid steppes, and therefore no villages. Also the Krasno-ufimskoi, between the rivers Belaia, Kama, and Tchussovaia, towards the Ural-chain, is mostly sandy; and that on the Argoun towards the borders of China, is of a still worse soil, consisting of rocky particles and flint. The whole of the steppe along the river Kushum, towards the town of Uralsk, is described by Prof. Pallas* as dry, poor, saline, and unfit for any kind of agriculture, for the breed of cattle, and even for permanent inhabitants; there is not even a solitary shrub to be seen, much less any wood. In general *saline spots are not unfrequent in the steppes;* and here and there we also meet with salt-lakes: however, such districts may invite to camel-pasture."—pp. 81, 83.

"The steppes are *frequently fired*, either by the negligence of travellers, or on purpose by the herdsmen, in order to forward the crops of grass; or, it may be, out of malice, as some years since the Kozaks of the Yaik did; when, having risen in rebellion, a small corps of Russian troops advancing against them, they saw themselves all at once almost entirely surrounded by the high grass on fire. Such a catastrophe often occasions great mischief; the flames spread themselves far and wide, put the dwellings of the inhabitants in imminent danger, consume the corn on the ground, and even seize on the forests. Many prohibitions under severe penalties have accordingly been issued against this practice, but they seldom have any effect.† All the steppes may be considered as a sort of common land."—p. 84.

"The steppe of the Don and the Volga comprises the whole space between the Don, the Volga, and the Kuban, and is a large, very arid steppe, altogether destitute of wood and water; it has few inhabitants, and contains several salt-lakes and salt-plots."——"Within the confines of this steppe lies what is called the Kuman steppe" ——"this, it is said, has all the appearance of a dried-up sea: it is a sandy, part clayey salt plain, without trees. Many circumstances render it probable that it might really have been the sea bottom, as the flat shores of the Caspian and Azof Seas, the shallowness of their coasts, the low situation of the steppe, the saline lakes, *and the sea shells,*" &c.—*Rees' Cyclopædia.*

Of the extensive Kamyk steppe, it is said in the same work, that "the soil consists of sand, *marle, and clay, often mixed with sea shells.*"

The latter passages include under the general name of steppes, steril deserts of altogether a different character. In like manner, some great tracts of naked sand in South America, are called pampas—and some of what are called prairies west of the Arkansas territory, are of somewhat similar general character to those described above. These are mentioned here to avoid the appearance of omitting what might be considered as opposing my positions. But these regions are altogether different from the lands properly called prairies or steppes—and have no more connection with our subject than if they had been more properly called sandy, stony, or salt deserts.

"*Pampas,* a province in South America in the

* Formerly Yaik. † Pallas, vol. ii. p. 75.

* Travels, vol. iii. p. 525.
† See Pallas, vol. ii. p. 378.

viceroyalty of Buenos Ayres, consists of vast plains, which extend from the sea coast on the east, to that great chain which forms the beginning of the Cordilleras of Chili, about 140 leagues west from the city of Buenos Ayres. Towards the south, they stretch about 100 leagues, to a chain proceeding W. N. W. from the Atlantic. The northern boundaries are not distinctly known, but the name of Pampas is chiefly applied to the territory on the south of Buenos Ayres, Cordova, and Mendoza. These vast plains, like the steppes of Russia, having scarcely any elevation, the view, as at sea, is terminated by the horizon. They are only diversified with paths and ditches, which collect the rain waters, and which commonly end in lakes, as there is no declivity; yet there are wide tracts in which *no water is found, nor is that element pure;* and the trees are extremely rare, except a few shrubs round the lakes. Hence this region is only inhabited by a few wandering savages. The soil is generally *a black earth of little depth, and is followed by a kind of coarse chalk, so that it is difficult to form wells, as the water can scarcely pass so tenacious a substance.* The chief pasturage is *clover*, and in the best parts, sometimes so strong as to resist the step of a horse: it is much liked by the cattle, which, when there is water, multiply prodigiously in the pampas."—*Rees' Cyclopædia.*

"On leaving Buenos Ayres, the first region is covered for 180 miles with clover and thistles; the second region (480 miles) produces long grass, without a weed; and the third reaching to the base of the Cordilleras, is a grove of low trees and shrubs, in which such beautiful order is observed, that one may gallop between them in every direction."——"The climate of the pampas is subject to great differences of temperature, though the gradual changes are very regular. The winter is as cold as an English November. The summer is oppressively hot. *But the whole pampas enjoy an atmosphere as beautiful and salubrious as the most healthy parts of Greece and Italy, without their malaria.*"—*Malte Brun's Geog.*

"The whole plain [nearest] to the foot of the Cordillera, is a loose sandy soil, greatly impregnated with saline matter, which is inimical to vegetation in the natural way. This immense tract is called the Traversia, or the Desert, resembling similar tracts in Africa. *When assisted by irrigation, it is the most fertile soil imaginable.*"—*Malte Brun's Geog. vol. 3, p. 362, (note.) Am. Ed.*

A late traveller from Buenos Ayres to the Andes Temple, speaks thus of the first and second regions of pampas:

"The country for leagues round is covered with thistles, which at this season are to be seen growing to the prodigious height of eight, and, in some places, ten feet: cattle which go in amongst them to seek a shade from the sun, and to feed upon the grass beneath, are completely concealed. These thistles* form almost the only fuel for the few inhabitants who are scattered over this vast wilderness: not a tree is to be seen, with the exception of a few peach trees, which have been planted in the immediate neighborhood of the huts."

"We now bade adieu to the region of thistles, through which we travelled for upwards of one hundred miles, and which, on each side of the road, extended as far as the eye could reach. At this season of the year, in consequence of these gigantic weeds being parched by the sun, the country, at a distance, had the appearance of being covered with ripe corn; but the scene was too monotonous to afford any agreeable impression. Madame de Stael, on her journey into Russia, remarks, [of the steppes] "there is so much *space* that every thing is lost—" "*meme les chateaux, meme la population. On diroit qu'on traverse un pays dont la nation vient de s'en aller.*" Here, on the contrary, the traveller would say that he traverses a country where the nation is *yet to come;* for every thing exists as nature first formed it, unimproved, uncultivated, untouched."

"After leaving the region of thistles before mentioned, we travelled for about 120 miles through a country of more agreeable aspect, though not a tree as yet appeared to our view, the whole being one vast field of rich pasture. This is the true pampa of South America, of which we have of late years read and heard so much in Europe.

"Innumerable herds of cattle, the progeny, it is said, of six cows and a bull, imported rather more than two centuries ago from Spain, range at large over this ever verdant surface of inexhaustible luxuriance. I have been credibly informed, that their numbers at the present day bear no proportion to what they were before the devastating havoc of the late civil war; still they appear to a European eye in countless multitudes, and leave the traveller no longer cause to wonder that such fine animals should, at one time, have been slaughtered in *thousands*, merely for their hides."

"This noble plain, entirely covered with pasture, extends many hundred miles into the regions of Patagonia, where it is yet unexplored. M. Humboldt calculated its area at 70,000 square leagues. "This area," he observes, "of the pampas of Tucuman, Buenos Ayres, and Patagonia, (they are all united) is consequently four times as large as the area of all France."

"No lawn was ever laid down with greater precision by the hand of man, than this vast interminable plain has been by nature. Not a stone is to be seen on its surface."—*Temple's Travels.*

"In the whole of this immense region, there is not a weed to be seen. The coarse grass is its sole produce, and in the summer, when it is high, it is beautiful to see the effect which the wind has in passing over this wild expanse of waving grass: the shades between the brown and yellow are beautiful. The scene is placid beyond description: no habitation or human being is to be seen, unless occasionally the wild and picturesque outline of the Gaucho on the horizon, his scarlet poncho or cloak streaming horizontally behind him, his balls flying

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* At certain periods of the year, when the clover withers enormous thistles, ten or twelve feet high, suddenly shoot up, hem in the roads and paths, and form a dense and impenetrable barrier. Mr. Head remarks: "The sudden growth of these plants is quite astonishing: and though it would be an unusual misfortune in military history, yet it is really possible, that an invading army, unacquainted with this country, might be imprisoned by these thistles, before they had time to escape from them."—*Head's Notes.*

round his head, and as he bends forward towards his prey, his horse straining every nerve."—*Head's Rough Notes, &c.*

Nature of prairie soils, so far as ascertained by chemical tests.

After I had ascertained the truth of the novel and strange fact that scarcely any soils in Virginia, or of the other Atlantic states, of which I had opportunity to examine specimens, contained any calcareous matter (carbonate of lime,*) it became a new subject of surprise to learn from articles which have been published in this journal (pp. 276 277, Vol. I.) that many of the prairie lands of Alabama were highly calcareous according to the observations of those who judged merely from appearances. Combining this fact with my own personal experience that old cleared lands, even slightly calcareous, were much more easily kept clear of young bushes, than naturally poor and acid soils—and with what I had read of the nakedness of chalk downs in England—and the general difficulty of rearing trees in calcareous parts of Europe—all served to build up the opinion which I now aim to establish, that the abundance of calcareous earth in prairie soils was the principal, and is a sufficient cause of the absence of trees. Still there had never been an analysis made of any such soil, to my knowledge, and there was no other kind of evidence (however slight) of such quality of any prairie soils, except of a part of Alabama: and reports of the constituent parts of soils, judged solely by the eye, or by the mere close neighborhood of calcareous rocks, I know from experience, deserved but little credit or respect. In 1834, I first obtained some such proofs from a few specimens of prairie and woodland soils from Marengo county, Alabama, and one from Mississippi. The prairie soils were all calcareous, containing from 8 to 59 per cent. of carbonate of lime: and these were the first specimens of highly calcareous soils that I had ever examined, except from shelly spots on the banks of our tide-water rivers. The woodland soils, like our limestone and other rich *neutral* soils† contained no *carbonate* of lime. Since then, other specimens have been received and examined from various parts of Alabama—and also the reports of analyses of others, made by Dr. Cooper and Dr. Gibbes of South Carolina, have been received, and have been published in this journal.‡ Most of these soils are highly calcareous. *But also some specimens of prairie soils contain not a particle of carbonate of lime.* This apparent contradiction will be considered hereafter.

It is proper to observe here that I do not extend the term *prairie* to any land bearing trees, unless of new growth, or land known to have formerly been without them. But the distinctness of this term is much impaired by its being now applied in Alabama, (and perhaps elsewhere) to soils having the same peculiar texture, appearance, and sensible qualities, though covered with trees. Thus "wooded prairies" are spoken of in the pieces formerly published in this journal, and referred to in this piece.

*Essay on Calcareous Manures, 2nd Ed. page 17 to 21.

†Essay on Calcareous Manures, 2nd Ed. p. 20, 21.

‡See pages 715 vol. II, and 272 vol. III.

In addition to new facts of the same kind, for the convenience of the reader, an abridged statement will here be given of the calcareous ingredients of all the prairie soils which I have formerly examined, or which have been analyzed by other persons, and the results communicated for publication to the Farmers' Register: and also of other neighboring soils, sometimes improperly called "prairies," though covered with growing trees. It is proper to observe, that my own examinations were confined to lime in one form of combination only—the *carbonate*—and that the silicious, aluminous, and vegetable ingredients, when mentioned, were judged of by the senses, and not by accurate chemical tests. My own trials and results will be given first.

Specimens of soils from Marengo county, Alabama, furnished and selected by Richard Cocke, Esq. (Described more fully at page 22, of Essay on Calcareous Manures, 2nd Ed.)

No. 1. Prairie soil of the most productive kind in Alabama—a black clay, with scarcely any sand, yet so far from being stiff, becomes too light by being tilled. Bears luxuriant crops of corn, oats, and cotton—but the last, after a few years, becomes subject to rust. Contained 8 per cent. of carbonate of lime. All this kind of soil lies on a substratum of "rotten limestone," (specimens of which contained from 72 to 82 per cent. of carbonate of lime,) and which rises sometimes to the surface, forming the "bald prairies."

No. 2. Bald prairie soil—"comparatively poor—neither trees nor bushes grow there, and only grass and weeds before cultivation—corn does not grow well—small grain better—cotton crops soon become subject to rust." Contained 59 per cent. of carbonate of lime. The general substratum of rotten limestone, in texture and appearance, as well as in chemical character, approaches the chalk of Europe more than any other earth known in the United States.

No. 3. Very rich cane brake land—a kind of prairie of a wetter nature, from the winter rains not running off freely, and the tenacious soil not permitting the superfluous water to sink through—contained 16 per cent.

No. 4. From the valley cane land—very wet through winter, but always dry in summer—after being ditched dry enough, and brings fine cotton, &c. Contained no carbonate of lime.

No. 5. From what is called the best "post oak land," on which trees of that kind stand from two to four feet in diameter—but little underwood, and no cane—nearly as rich as the best cane land. No carbonate of lime.

No. 6. "Palmetto land," having that plant as well as a heavy and luxuriant growth of large trees. A cold and wet soil before being brought into tilth, but afterwards soft and easy to till, and produces corn and cotton finely. The cane on it generally small. Soil from 4 to 10 feet deep. No carbonate of lime.

Selected by Dr. W. J. Dupuy—

No. 7. Soil from the Choctaw Prairie in Mississippi, an extensive body of fertile land. Contained 13 per cent. of carbonate of lime.

Selected and sent by Dr. R. Withers, of Greene county, Alabama—

No. 8. From Kemper county, Miss. part of a "considerable body of similar land, extending into

Neshobak and Winston counties. Chocolate colored sandy loam, very friable, and easily worked —produces corn and cotton well—growth, hickory, black-jack and some other oaks, principally red oak, interspersed with a few pines." Contained no carbonate of lime.

No. 9. "Prairie soil from near Demopolis, Alabama, taken from the road near the surface. The rock here is within a few inches of the surface, and many small fragments are mixed with the soil. It is a dark calcareous mould—produces corn finely, but there is too much lime for cotton." Contained 60 per cent. of carbonate of lime.

No. 10. Subsoil of the common "open prairie" of Greene county, taken from a foot or more below the surface. "The soil above is dark, and probably less calcareous. The rock is not more than two feet below the surface. Lime was perceptible in this specimen in powder, in detached masses, before being pounded." Contained 50 per cent. of carbonate of lime.

No. 11. "From the southern part of Noxubee county, Miss.—taken 4 inches below the surface, of land cultivated two years. It is a prairie country, but different from ours on this side of the Tombeckbe, in having the elevated parts of it, which hardly amount to hills, covered with hickory trees,interspersed with some black-jacks. Hence it is often called a "hickory barren" country. Between the timbered portions, there are long savannas, or open prairies, which are very level and rich. This specimen was taken from one of them. It is covered with a very heavy grass coat, very much resembling the gama grass; and some of it I know is of that species. It is at first very difficult to eradicate; but when this is once effected, the soil is as easily ploughed as other prairie soils, and produces corn very finely; say from 50 to 60 bushels to the acre. Cotton however is predisposed to rust at first, and probably will be more so after the undecomposed vegetable matter existing in the primitive soil becomes exhausted. Immediately on the outskirts of the hickory hammocks, where they join the open prairie, the cotton is much more disposed to rust, even the first year, and it is from such a locality that was selected

No. 12. This soil is very loose and friable, and it is generally in such land that I have observed the cotton to rust most. It grows off at first more luxuriantly than in other places, but as the heat of summer comes on, begins to look scorched, sheds its shapes, then the bolls and leaves, until nothing is left but the dead stalks. These two specimens Nos. 11 and 12, do not effervesce perceptibly with diluted sulphuric acid, but I presume you will find them strongly impregnated with lime. There is a considerable tract of country of this kind of soil in Mississippi, and the limestone rock frequently shows itself near the surface. Detached masses of sand stone are also frequently seen about the hill-sides and hickory hammocks."

Neither of the last two specimens (Nos. 11, 12,) contained any carbonate of lime. The descriptions have been quoted at length, because the facts are among those that most oppose my argument. A similar deficiency of calcareous earth was found in the four next specimens, which were sent by Capt. John Symington, U. S. A. of St. Louis.

No. 13. From a small prairie in the neighborhood of St. Louis, Missouri. Fertile, but not equal to the best prairie soils. "This is high and rolling, and consequently dry—and never subject to inundation. Specimen taken about 4 inches below the surface, and just below the fibrous grass roots."

No. 14. "From the surface of a ridge of rolling prairie in Macoupin county, Illinois—high and dry, and never subject to inundation."

No. 15. From Macoupin county, Illinois. Also high prairie, and never subject to inundation, but quite level, and therefore the rain water does not flow off rapidly enough. Still it cannot be called a wet soil. It is considered rich, and produces well grain of all kinds. Taken 2 feet below the surface."

No. 16. Sent by George Churchill, Esq. Sample of the soil of the "Ridge Prairie," Madison, Illinois—"taken from 4 inches below the surface, where it has never been ploughed, and three-quarters of a mile from the nearest wood land. Surface dry and rolling."

Neither of the four last specimens contained a particle of carbonate of lime. All were very black (therefore supposed full of vegetable matter) and contained but a very small proportion of finely divided silicious earth. For any practical and useful purpose, this essential ingredient might almost be said to be entirely wanting.

No. 17. Prairie soil from Madison county, Ohio —contained no carbonate of lime.

No. 18. Prairie soil from Pickaway county, Ohio, contained a very small portion only of carbonate of lime. The amount was not ascertained precisely.

The three next, selected and sent by Jas. Deas, Esq. were all taken from different depths below the same field of "unwooded prairie," in Lowndes county, Alabama. The surface soil black.

No. 19. Taken $4\frac{1}{2}$ feet below the surface, where very fertile—stiff clay of dark olive color when dry, and pounded for trial—very little silicious earth, and that very finely divided. Contained 11 per cent. of carbonate of lime.

No. 20. "At $1\frac{1}{2}$ feet below the surface, where the soil is rather thin" [or poor]—nearly white—contained 84 per cent. of carbonate of lime.

No. 21. At 3 feet below the surface of another place, "also rather thin soil." Color darker than the preceding. Carbonate of lime, 27 per cent.

No. 22. Of the celebrated fertile alluvial soil of Red River, Arkansas, a specimen of 300 grains contained 12 grains of earthy carbonates, of which rather more than one-third was found to be *carbonate of magnesia*—the remainder carbonate of lime. So far as I am informed, this is the first known fact of magnesia being found in a notable proportion in any soil in this country. It is hoped that this peculiarity of the Red River land will receive further investigation. The presence of magnesia was indicated by the very slow effervescence of the soil in acid. The separation of the two carbonates was made according to Davy's method (directed in Agricultural Chemistry,) which, however, is not very accurate.

The results of analyses of prairie soils (and some which though so called, are covered with trees,) made by Drs. Cooper, Nott, and Gibbes, will now be adduced. See the more full report Farmers' Register, p. 716, Vol. II.

No. 23. Bald prairie on Big Swamp, Lowndes, Alabama. Plantation of Col. James Deas. Carbonate of lime 25 per cent.

No. 24. Slue prairie—same plantation—15 per cent.

No. 25. From plantation of Messrs. Elmore & Taylor, on Pintlala creek, Montgomery, Alabama—open prairie—taken 6 inches below the surface. Carbonate of lime 38 per cent.

No. 26. From same spot, taken 18 inches below the surface. Carbonate of lime 48 per cent.

The balance were very late examinations of Alabama soils made by Dr. R. W. Gibbes, July 1835, and published in the Farmers' Register of last month.

No. 27. Slue prairie, (Col. Elmore's plantation) —6 or 8 inches below the surface—Carbonate of lime 26 per cent.

No. 28. Hammock prairie—carbonate of lime 22 per cent.

No. 29. Open prairie—mahogany colored—*no limestone*, and vegetable matter as much as 38 per cent.

No. 30. Hogbed prairie—carbonate of lime 8.

No. 31. Post oak prairie—*no limestone*—and vegetable matter 38 per cent. [From the name, it is presumed that this is such wooded land as No. 5, and therefore improperly called prairie land.]

No. 32. Black slue prairie—(Moulton plantation of Dr. J. H. Taylor.) Carbonate of lime 12 per cent.

No. 33. Prairie—(scattering large post oak)—mingled with red clay. Carbonate of lime 6 per cent.—and vegetable matter 32.

No. 34. Open prairie—from a hill or ridge, 18 per cent.

No. 35. White open prairie, (Chisolm's)—from near surface—soil not more than 18 inches deep. Carbonate of lime 42 per cent. Vegetable matter 28.

Formation of prairies, &c. accounted for, and apparent exceptions to the rule explained.

My views of the manner in which prairies are formed, will now be submitted.

There are some few trees, as wild or black locust, papaw, and hackberry, which thrive best on soil moderately calcareous, and will scarcely live in soils very deficient in lime. But most forest trees prefer soils having so little lime, as to be, if not naturally poor, at least unfriendly to the growth of grass. Hence such lands are covered naturally by an unmixed growth of trees, and are almost destitute of grass. Calcareous soils are, on the contrary, favorable to the growth of grass, and unfavorable to the growth of trees, and the more so (other circumstances being alike) in proportion to the excess of lime in the soil. Supposing such a soil to have been so protected as to be covered with trees, the first passage over it of fire, which would be harmless to the more hardy growth of acid soil, would here serve to scorch and damage the trees, feeble and tender, because unnaturally placed. This effect would be the greater because such calcareous woodland would have some growth of rank grass, which, as dry fuel, would add to the violence of the fire, and its effects. The next winter, the crippled and stinted condition of the trees would prepare them to be still more damaged by the like passage of fire—and its violence would be increased by the greater quantity of dead wood, and the increased growth of grass less obstructed now by shade. Every year these circumstances would serve the more to augment the destructive power of the fires, and to diminish the power of resistance in the still living trees. In the course of time all the trees would be killed, and burnt—and then the seeds and roots, after springing in vain many succeeding summers, would finally have to yield to destruction also. The surface is then covered with the growth of grass most suitable to its composition, which growth is luxuriant according to the fertility of the soil. So long as fires sweep every year over such land, the prairies can never be covered with wood; and on the contrary, will be extending every year so long as there is wood which the fires can destroy, and land that will yield grass to furnish the fuel for still extended ravages.

It may well happen also, that a soil not at all calcareous, if bordering on a prairie, would be exposed to such power of fire, when driven in all its violence by a strong wind, that its trees would be damaged, and finally killed, and the land brought likewise to the prairie state. Such land however, would be making continual efforts to return to its more natural state of woodland—and whether under young wood, or a meager cover of grass, would, by refusing fuel, serve to check the farther extension of the ravages of fire.

This would be one means of land not calcareous being brought to the prairie state. There are two other means for the formation or extension of prairies, on land not calcareous, both of which are probably more often operative. These will now be considered.

It may be inferred that the destruction of trees on calcareous soils is not so much caused by their absolute unkindliness to trees, as by their far greater suitableness for grass, which serves when dry, as fuel to burn the trees. Now if any thing other than the presence of calcareous earth will produce an equally rank growth of grass, the same destructive end will be produced, and as completely in time, though perhaps with less facility and quickness. Moisture in the soil will in this manner serve as well as calcareous matter—and if the surface is only dry enough at some time in every year to permit full force to the fire, similar effects must be produced in destroying and keeping down the growth of trees. In this manner are formed the rich alluvial prairies or savannas on the great western rivers, which are covered by floods sometimes, and perfectly dry at others.

Again—a soil may be free from floods, and from all water except from the clouds—and yet without being calcareous, may be so constituted as to attract and retain moisture with great force, and thus be very favorable to the growth of grass, and consequently to the formation of prairies. This constitution is produced when a soil is formed almost entirely of fine aluminous, or argillaceous earth, and decomposed vegetable matter—and this is precisely the composition of every specimen of prairie soil which I have examined, and which was not highly calcareous. Examples of such soils are presented in the foregoing list. The soils contained very little silicious earth, and that little so fine as only to be made sensible to the teeth. The ordinary mode of separating silicious from aluminous earth, by agitation in water, was quite ineffectual for the purpose. Though no *carbonate* of lime was present, it is certain that the soils were neutral*—that is, that they contained in some other combination enough lime to make fertile and absorbent soils. This, added to the quantity of finely divided vegetable mould, and to the fine clay forming nearly the whole earthy portion, forms a soil that holds water like a sponge, and must be peculiarly favorable to the growth of grass.† This alone will suffice to account for prairies being formed on such soils—even if soils so destitute of silicious parts are not (as I think to be very probable, but do not know to be) as unfavorable to the growth of trees as are dry calcareous soils.

Practical application of the foregoing views, for the improvement and better cultivation of prairie lands.

The calcareous prairie soils as well as all those not calcareous, are in general remarkably deficient in sand, and would be far more valuable but for this deficiency. This excess of aluminous earth (or pure clay) and not the calcareous matter, causes the remarkable and troublesome adhesiveness of these soils. Is it also not likely that to this defect of constitution is owing the great prevalence on prairie soils of the rust in cotton? It cannot be caused by the calcareous earth, as two of the specimens which were sent by Dr. Withers from land peculiarly subject to produce that disease, contained no carbonate of lime. But whether or not the *rust* is one of the evil effects of a great deficiency of sand, there are enough others, to make it very desirable to remedy this defect in soils otherwise so valuable. This might be done, by the process of paring and burning the soil, as is often done in England, when a new or sod-covered field is brought from pasture into tillage. The first preparing of prairie soil for tillage, by the plough, is very laborious, and perhaps it would not be much more troublesome to pare and burn the sod. This would be the most perfect preparation for tillage; and the unrotted and redundant vegetable matter would be converted from a nuisance to a benefit; and the fine clay burnt to brick-like particles, would form an artificial coarse sand, serving to open and cure the previous close texture of the soil. If the turf had already been conquered by tillage, burning clay in kilns, as was practised, for manure, in Europe, and by some in the Atlantic states, would serve the same purpose of providing a durable earthy ingredient acting mechanically like coarse sand. By paring and burning the surface of the soil, prairie lands might also be made more healthy. It is true that they are now considered generally healthy—the calcareous prairies especially. But though there may be lime enough in most cases, to hold in combination the immense quantity of vegetable matter, still the latter must be greatly in excess in many cases; and when so, must be rapidly decomposing, after being ploughed, and evolve effluvia injurious to health. If the prairie lands could by a miracle be suddenly and completely deprived of all their lime, the decomposition and waste in the air of their putrescent matter would make them as sickly as the western coast of Africa.

Exceptions and apparent contradictions explained.

Supposing these general causes to operate in the formation of prairie lands, the least reflection will show that their power and effects will be often greatly modified by other circumstances. It is well known that in prairie regions, the borders of rivers and small streams are generally clothed with trees. They are protected from the fires in some measure by the dampness of the earth, and because low bottoms are more sheltered from winds. The river also is a secure barrier against the flames, and therefore always guards one of its banks, at least. Even the close neighborhood of those exempted places, would diminish the violence of the flames: and spots abundantly calcareous, and lying high, might thus retain their wood growth. It would require that the flames should pass over a considerable space, and with a full supply of dry fuel, to acquire the requisite force and rapidity for producing destruction. Therefore the vicinity of the wooded banks of a river would not probably be changed from woodland to prairie, by any fires driven by winds *from* the river. To produce this effect, the winds which prevail in dry seasons must drive the flames *towards* the rivers, and downward between their forks. The existing state of things on the borders of the Mississippi and Missouri (as I have been told) accords well with this position. The north-west winds are generally dry, and blow with great violence; and whenever their direction is between the forks of streams and down their course, the prairie extends nearly or quite to the water's edge. But streams running from the opposite slope of the great valley, oppose the course and obstruct the effects of these fires—and the easterly winds which would bear on them in like manner as to direction, are generally accompanied by rain. Therefore in the last situation, calcareous soils may retain their growth of trees, and in the former, soils well constituted to nourish and support them, may be brought to the state of poor prairie land.

If these general views are well founded, the manner in which prairies are formed can no longer be mistaken; and though a highly calcareous soil is deemed the most general and the most important means, the theory serves as satisfactorily to explain the existence of prairies on various other situations, though the soil be not calcareous.

Ancient prairie lands in the limestone region of Virginia.

In the foregoing observations I have limited the total absence of prairies in the Atlantic states to the eastern slope from the mountains to the sea, and to all poor land even among the mountains. In the rich limestone lands of Rockbridge county, and perhaps on similar soils elsewhere, there certainly were prairies at an early period. When

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*Essay on Cal. Man. p. 22, 2nd Ed.

†Mould [*terreau*] can absorb double its weight of water without appearing moist; and after being dried, it draws from the atmosphere in less than twenty-four hours, a quantity of water, which may vary according to the humidity of the atmosphere, from 80 to 100 per cent. of its weight.—*Berzelius*—quoted in Essay on Cal. Man. p. 81, 2nd Ed.

that part of Virginia was first settled by the present race of inhabitants, large bodies of land were covered entirely by young sapling wood, and there were other indisputable proofs that at an earlier time few trees, if any, had been there growing. But though these lands are enough impregnated with lime (in some form) to be very rich, and to be favorable to the growth of grass, *they contain no carbonate of lime**—and therefore the land must have been brought to the prairie state slowly and with difficulty, under the long continued operation of annually repeated fires—and their intermission for a few years was enough to enable the soil to again throw up a new growth of young trees. These appearances were so well known in Rockbridge, that some very intelligent persons, born and reared in that county, have thence inferred that the wood cover of our country was every where comparatively recent—and that at some former and not very remote time, every part of this continent had been without trees: which is an example of very erroneous reasoning from particular to general facts.

Of soils rendered barren by excess of calcareous matter—and the fertility produced on them by irrigation.

The "bald prairies" of Alabama present the only known cases in the United States of bodies of land so highly calcareous as to be thereby lessened in productiveness. This effect will increase as exhausting cultivation shall lessen the vegetable ingredients of the soil—and probably (under a continuation of such tillage) the barren spots will extend widely into what now form their fertile margins. The quantity of vegetable matter accumulated in the highly calcareous prairie soils is now so great, that a very long course of exhausting tillage will be borne before sterility can be produced. Nevertheless, however remote may be that result, its occurrence is not the less sure, if exhausting tillage is pursued. Similar to our rich prairies probably was the original state of the now poor chalk downs of England, the almost barren plains of "Lousy" Champagne in France—and some of the still more hopeless deserts of Asia. The furnishing or retaining of a sufficiency of vegetable matter would cure this kind of barrenness, and more easily will prevent its extension beyond its present limits, in our own new country. In other countries, water alone, used for irrigation, has had the effect of making highly fertile, and keeping it so, land so calcareous that it would otherwise have been altogether barren. Many facts of this kind may be gathered from the writings of travellers—but their notices are very slight, and merely incidental, as none who have viewed and described these lands, possessed any agricultural knowledge. Some of these passages will be quoted. In some far remote future time, perhaps the overflowing wells of southern Alabama, may be used to irrigate the excessively calcareous soils, and to retain or restore their fertility.

Denon, in his *Travels in Egypt*, (Am. Ed. vol. 2, p. 4,) when at Siut, or Lycopolis, 2½ degrees south of Cairo, speaks thus of the Lybian range of mountains. "I found this, as I had supposed, a ruin of nature, formed of horizontal and regular strata of calcareous stones more or less crumbling, and of different shades of whiteness, divided at intervals with large mamillated and concentric flints, which appear to be the *nuclei*, or as it were, the bones of this vast chain, and seem to keep it together, and prevent its total destruction. This decomposition is daily happening by the impression of the salt air, which penetrates every part of the calcareous surface, decomposes it, and makes it, as it were, dissolve down in streams of sand, which at first collected in heaps at the foot of the rock, and are then carried away by the winds, and encroaching gradually on the cultivated plains and the villages, change them into barrenness and desolation." The Lybian chain of mountains which runs nearly parallel with the Nile, there approaches very close to it, and the narrow strip of fertile and irrigated land between, must necessarily have been deeply though gradually covered by the same calcareous sand; (indeed the continued operation of the like causes is raising, not only the borders, but even the bed of the Nile:) yet Denon mentions particularly the high state of cultivation seen in his next day's journey up the river. It is well known, that wherever the waters of the Nile have been conveyed to irrigate these sands, an astonishing degree of fertility has been the immediate consequence: and that wherever the canals for this purpose have been permitted to become dry, (often the effect of political causes on this wretched population,) there is as sure a return to the former state of naked and barren sand. There is reason also to believe (though upon slighter foundation,) that portions of the great deserts of both Asia and Africa, also are excessively calcareous, and owe their sterility to that cause, combined with the general absence of water. The only direct testimony as to this character of the soil, is in the following passage from Madden's Travels. He was in the desert between Egypt and Judea. "Next day we travelled all day long without seeing a single tree, or the smallest patch of verdure, or laying our eyes on any human being."———"The soil was no longer sandy, but of a hard gravel, on which a carriage might be rolled from Salehie to Suez. At night we stopped at a well without water, and here I examined the soil, three feet below the surface; [for] two feet deep there is a superficial stratum of calcareous pebbles, and below that, a solid bed of limestone, which I believe to be the basis of the soil of all Egypt."—[p. 122, vol. 2, Am. Ed.]

"One thing is certain that wherever there is water, no matter in what part of the wilderness, there vegetation is to be found. The stopping up of the canals, and the want of irrigation, are the great causes of desolation which favor the extension of the desert. The country from San to Salehie, and probably to Suez, was formerly a cultivated country: the ruins of palaces, such as those of Zoan and that of Beit Pharoon, now in the middle of the desert, prove that the country around then must have been cultivated, and that at a very short period before our era."—p. 126.

Lieut. Burnes, who has recently published the very interesting account of his travels across central Asia, after describing, in various detached passages, the barren and often naked sands of the great Tartarian desert, over which he had been many weeks passing, and of the great scarcity of water, even in the few wells, and the total want of

*Essay on Calcareous Manures, 2d Ed. p. 17, et seq.

it elsewhere, thus describes the approach to the river Moorghab, or Merve, and the effects of irrigation. "By the time the sun had set, we found ourselves among the ruins of forts and villages, now deserted, which rose in castellated groups over an extensive plain. I have observed that we were gradually emerging from the sand-hills, and these marks of human industry which we had now approached, were the ancient remnants of civilization of the famous kingdom of Merve, or Meroo. Before we had approached them, we had not wanted signs of our being delivered from the ocean of sand, since several flocks of birds had passed over us. As the mariner is assured by such indications that he nears land, we had the satisfaction of knowing that we were approaching water, after a journey of 150 miles [from the last habitable spot] through a steril waste, where we had suffered considerable inconvenience from want of it."——"This river was formerly dammed above Merve, which turned the principal part of its waters to that neighborhood, and raised that city to the state of richness and opulence it once enjoyed. The dam was thrown down about 45 years ago by Shah Moorad, a king of Bokhara, and the river now only irrigates the country in its immediate vicinity. The inhabitants cultivate by irrigation, and every thing grows in rich luxuriance"——and where the waters have been withdrawn, as stated above, the country is again a desert, and the former habitations tenantless ruins. Another inhabited and cultivated spot in the desert, is afterwards thus mentioned. "The country around Shurukhs is well watered with aqueducts from the rivulet of Tejend, which is a little brackish, but its waters are usefully employed in fertilizing the fields. The soil is exceedingly rich, and possesses great aptness of agriculture; the seed is scattered and vegetates almost without labor. The harvest is rich."——"The inhabitants repeat a tradition that the first of men tilled in Shurukhs, which was his garden, while Serendib or Ceylon was his house! There is not a tree or a bush to enliven the landscape."

But these speculations however plausible, would require many additional facts and proofs, to place them on as sure ground, as I flatter myself, the earlier part of this essay has done for the cause of the formation of prairies. However interesting it may be to the inquiring mind to extend views so far upon unexplored ground, prudence admonishes that in that way I have already exceeded the proper limits of argument sustained by known and undoubted facts.

From the Genesee Farmer.

DURABILITY OF POSTS.

We have several times called the attention of our readers to certain facts proving the much greater durability of timber, and particularly of such kinds as are exposed to damp—when the trees are cut *after* the leaves are fully expanded, and *before* the sap rises in the spring. It has been made a question however, whether posts are more durable when planted *green*, or after they are *seasoned?* We believe a very common opinion is, that they are more durable when well seasoned; but a correspondent in the Farmers' Register says, "my garden enclosure was erected of posts while green. Several pieces remained exposed until they were completely seasoned. Out of these a horse-rack was constructed which was entirely rotted down, while every post in the garden remains firm."

We suppose these "pieces" were used for posts to support a horse-rack in the open ground, and unprotected from the weather. We have no recollection of having ever witnessed any thing similar; and we should be glad if our correspondents can throw any light on the subject—remembering however, that a regular detail of facts, is the most satisfactory.

From the Genesee Farmer.

HYBRID SQUASHES.

It has been made a question whether the effects of hybridism are perceptible in the fruit which encloses those seeds that produce hybrids? That is whether a melon which has undergone cross-fertilization from an inferior variety, will when it ripens, be of inferior flavor, in consequence of such process? According to the principles of vegetable physiology no such deterioration can happen. The inference for practical gardeners therefore is, that they may plant all the different varieties of melons, cucumbers, squashes, and pumpkins in the same quarter without any apprehension that the fruit of that season will be injured in the least; and if no seeds are to be saved for planting, then no damage whatever will accrue. In other words, the first appearance of intermixture would be in the fruit which is derived from such seeds.

We give the following statement in proof of this doctrine—promising that the *two* kinds of summer squashes which we cultivate, are, 1. The bush or pattypan squash *(cucurbita melopepo)* and 2. The long running squash *(cucurbita subverrucosa.)* The principal points in the character of the *first species*, to which we invite the reader's attention, are, the *stem* or *vine*, which, according to Loudon, is only three feet long; and the *fruit*, which is "depressed, umbonate, and tumid at the edge." From this the *second species* differs by a *vine* twelve feet in length, with "fruit clavate [club-shaped,] elliptical and somewhat warted."

Last spring we were very particular to take the seeds of these two kinds from the squashes, (which were fine specimens,) and plant them with our own hands. The following anomalies have occurred: from a seed of the bush squash, we have a vine five feet in length which nourishes a round yellow field pumpkin, now nearly ripe. From several seeds of the running squash, we have short stems not exceeding three feet in length, bearing long squashes, in the same crowded manner as the bush squash bears its fruit. From one of the latter sort of seeds however, we have a vine six feet in length, which produces fruit intermediate between the long squash and the pumpkin, having a thick straight neck, but in other respects resembling the outline of the winter squash. All of them are unquestionably hybrids.

From the *Code of Agriculture*, of the 5th Edition, 1832.

ON THE NATURE OF THE DISEASE, CALLED "THE SMUT" IN WHEAT, AND THE MEANS OF PREVENTING IT.

This disease, in French, is called "*Le carie*," and in botanical language, "*ustilago*." It is a species of degeneracy of the grains in the ears of wheat, by which the substance that should form flour in the grain, becomes entirely changed into a black powder, similar to a puff ball, or dusty mushroom. (*lycoperdon globosum.*) Wheat affected with this disease, when mixed with seed in a sound state, diminishes its value, imparts a dark color to the flour, and is said by some to possess noxious qualities. The disease has a great tendency to spread, and to contaminate all the adjoining grain, rapidly extending the mischief. No wonder therefore, that its ravages should have commanded the attention of husbandmen, in all ages, and in almost every country. It was formerly so common, that in some countries it was not unusual, to see twice or thrice as many smutted ears of corn, as sound ones. Fortunately, the means of preventing it have long been in the power of every farmer, for any operation that completely frees the seed from smutty powder (the source of the infection,) or that destroys it by acrid, corrosive, or poisonous applications, will have the effect of securing a clean crop;* and though sometimes crops may escape without preparation, that is no reason, why every rational means should not be adopted, to guard against such an evil.

As a safeguard, it is an excellent practice, before the wheat seed is first put into any liquid, to run it, *very gently*, through a riddle, when not only the smut balls, but the imperfect grains, and the seeds of weeds, will float, and may be skimmed off at pleasure, which is not the case when the seed is put hastily into the brine or water.†

Numerous are the modes by which smut may be prevented; as, 1. By pure cold water and lime; 2. By boiling water and lime; 3. By water impregnated with salt; 4. By urine pickle; and, 5. By a variety of other processes, to be briefly enumerated.

1. *Pure cold Water and Lime.*—So important an operation, as the preparation of seed wheat, ought not to be performed in a slovenly manner, if the object be, to secure with certainty, the future crop, from so destructive a disease as smut. It may be effected, however, by pure cold water, provided the seed be washed in several waters, frequently stirred, so as to give the light grains an opportunity of rising, that they may be skimmed off, and repeatedly changed, until it be perfectly clean. It should then be dried by quicklime, slaked either with sea, or with boiling water.‡

2. *Boiling Water and Lime.*—This mixture, when properly applied, is found to be effectual. Sometimes chalk-lime, recently burnt, is put into a copper of boiling water, and as soon as the lime is dissolved, the mixture, at this degree of heat, is poured upon the wheat, previously spread upon a stone floor, and the wheat and mixture are immediately well turned together with shovels.* Sometimes the wheat, put into a common wicker basket, is dipped two or three times in a mixture of hot water and quicklime;† and sometimes boiling water and quicklime have been successfully used, after the seed has been well washed and skimmed.‡

3. *Salt Water.*§—It is a still more effectual practice, to make use of either fresh water, so impregnated with salt, that an egg will float in it, or of sea water, with such a quantity of salt dissolved in it, as to be equally strong, by which its specific gravity will be so increased, that all unsound grains will swim in the pickle. About a bushel of wheat at a time, is put into a sufficient quantity of this pickle, in which, when stirred, all the light or diseased grains will rise to the top, and may be skimmed off. The seed wheat is then separated from the pickle, spread upon the floor, and a sufficient quantity of new slaked lime, to dry the whole, sifted upon it.¶ If the wheat is to be drilled, after being limed, it should lie a day on the floor, or be kept for that space of time in sacks.

4. *Urine Pickle.*—Some farmers are satisfied with merely sprinkling a heap of seed with stale urine, and then drying it with lime; and there can be no doubt, that by this mode of pickling, if carefully done, the object may be effectually answered. Others prefer steeping the seed in pure water, (skimming off any light grains that may float on the surface,) and then applying the urine to the seed. The grain thus first imbibes a harmless species of moisture, and the more acrid matter to be afterwards applied, only acts upon its surface, where the source of the evil is deposited. This is attended with some additional trouble, but is an excellent precaution, by which any risk of injury, from the after application of the urine, is prevented, should the grain not be immediately sown, which, however, is desirable. After the wheat has been pickled with urine, and dried with quicklime, if not immediately used, it ought to be spread

* Sussex Report, p. 85, note.

† Communication from Mr. Blaikie, at Holkham.

‡ Northamptonshire Report, p. 89; Surry Report, p. 217; Cornwall Report, p. 60; North Riding Report, p. 112; Annals of Agriculture, vol. xxi. p. 210.

* Middlesex Report, p. 207.

† Dorset Report, p. 212.

‡ Buckinghamshire Report, p. 179. An experienced agriculturist has used this pickle for his seed wheat during the space of 15 years, and with uniform success, though he was twice or thrice under the necessity of using smutty seed. He generally added one gallon of soap-lees to ten of water, and kept the seed in steep, from 15 to 24 hours. But he agrees with the late celebrated Arthur Young in opinion, that steeping for 24 hours is necessary to prevent smut effectually.—*Remark by Edward Burroughs, Esq.*

§ Tull informs us, that brining seed wheat, to prevent smut, was first practised about the year 1660, when a vessel with wheat was sunk near Bristol, and the grain so much injured by salt water, that though it would vegetate, it was considered to be unfit for bread. It was taken out of the vessel at low water, and sown in different parts. It was free from disease at the following harvest, when wheat in general happened to be smutty. This accident led to the practice of brining.

¶ East Lothian Report, p. 111.—In Norfolk, wheat previously moistened with pure water, is candied with lime, slaked by very strong brine. The lime is applied in its hottest state, and smut is thus prevented.—*Marshall's Norfolk*, vol. i p. 219.

as thin as possible, upon a stone floor, to become dry. If it be put close together, and lie in that state for a day not a grain will vegetate.

5. Various other steeps and practices have been recommended, as soap-boilers' leys,*—a ley of wood ashes—lime water—a solution of arsenic,†—powdered wormwood in stale urine—and kiln-drying the seed, which, though a hazardous, is, when properly executed, a successful mode of preventing smut‡.

In every preparation it is necessary, either to kill, or mechanically to force off, the semina of the smut.

The most effectual steep, for destroying the seeds of the smut that are attached to wheat, was discovered several years ago by Mr. Benedict Prevost, and strongly recommended to the attention of the author of this work, by that intelligent naturalist, as an infallible remedy. Instead of brine, urine, or any of the ingredients that have been mentioned above, Mr. Prevost uses vitriol, (the sulphate of copper,) in the following simple process. The steep or preparation is made up at the rate of one ounce of blue vitriol, dissolved in an English gallon (wine measure) of water, for every bushel of wheat. Into this mixture the grain is thrown, or passed through a sieve; and being frequently stirred for about half an hour, and the grain which swims on the surface skimmed off, that which has sunk in the liquid is thrown into a basket that the water may run off. It is next washed in rain or pure water, so as to prevent injury to the grain, and the seed is dried, either with or without lime, and then sown. The grain should be well cleaned, and thoroughly dry at the time it is put into the liquid. The grain, after being thus prepared, may be kept without injury, and the remedy, when properly used, may be considered "to be infallible."

Having frequently recommended this preventive against the smut, after my having first discovered it in the course of an excursion to the continent, I flattered myself that its efficacy would soon be tried by a number of zealous and experienced farmers. But it is a true saying in regard to agriculture, as well as many other arts, "*What is every body's business is nobody's.*" Each individual wishes to throw the load off his own shoulders, in hopes that his neighborhood will undertake the trouble and risk of the experiment. Hence this important suggestion might have remained unnoticed, had it not fortunately attracted the attention of some public-spirited agriculturists in the town and neighborhood of Birmingham. To them, the use of the *sulphate of copper*, (from their being more accustomed, than the generality of farmers, to articles connected with manufactures and chemistry,) was not an object of apprehension.

Mr. Richard Hipkys, of Paradise-street, Birmingham, was the first person, at least in that neighborhood, who was prevailed upon to try the powers of the proposed application. He states, that in the autumn of the year 1817, he met with a small work, written by the President of the Board of Agriculture, in which the sulphate of copper was recommended as a remedy against the smut. That he had no faith in steeps, from the previous want of success in the use of them, notwithstanding the application of the usual remedies, having had considerable breadths of wheat, rendered absolutely unsaleable, *for the four preceding years*, by the ravages of that destructive disease. Yet to gratify the wishes of an esteemed friend, he was induced to make a trial that year. That in the course of his experiments, he found his crops were free from disease, exactly in proportion to the quantity of sulphate used. That having ascertained there was no hazard in the operation, he caused the whole of his seed wheat, used in autumn 1818, and also some Talavera wheat that was sown in the spring of 1819, to be prepared in the manner to be afterwards described. The result was, that by the use of blue vitriol, he had a beautiful crop of wheat, entirely free from smut, *and every other disease.*

In the autumn of 1819, he sowed thirty three acres of wheat, and in the spring of 1820, nine acres of Talavera and Cape wheat, prepared in the same manner. The result at harvest was again, crops of grain *entirely free from disease.*

In the seed time of 1819, Mr. Hipkys induced a particular friend, whose soil and situation were perfectly different, to make a trial of the sulphate, which he did with the most satisfactory and decisive results. The particulars have been detailed by Mr. Hipkys, in the Farmer's Journal, at that gentleman's particular desire. Letters subscribed by him, have been transmitted to me; and though he declines having his name mentioned, there can be no doubt, that the facts he states, may be confidently relied on, and that the success of this plan of preventing smut, is placed beyond the possibility of doubt.

The nature of smut is now well known. It is a small and delicate microscopic plant which would soon be destroyed by the variations of the atmosphere, if wheat did not offer an asylum, where it could propagate itself. While it is only attached *externally* to the grain, and before its seeds, or germs, have penetrated into the plant, its germination may be effectually prevented, by any operation that will clear the grain of the smutty powder, or that destroys it by acrid, corrosive, or poisonous applications. If nothing effectual is done for that purpose, the smut penetrates into the plant of the wheat, while it is still very young. There it produces globules, which increase with the ear, and become perfect seeds when the wheat approaches to maturity. If however, the seed is forfeited

* Derbyshire Report, vol. ii. p. 116.

† This is strongly objected to, from the hazard attending it, and its destruction of game. A farmer in Essex, who was accustomed to steep his wheat in a solution of arsenic, had his crops exempted from smut, but he was remarkable for bad health.

‡ At Wooler, in Northumberland, it is said, that passing seed wheat loosely through mill-stones, so as not to injure the grain, has been found to prevent smut; the seed of the disease, which is commonly lodged in the downy part of the grain, being removed by that operation. Mr. Prevost has proved, that smut originates from the seeds of a fungus, for he has grown it on moist cloths. See Hints on the Agricultural State of the Netherlands; Appendix, p. 5. There is a luminous exposition of the chemical nature of the smut in wheat, and a correct analysis, extracted from the works of Fourcroy and Vauquelin, in Mr. Hoblyn's Prize Essay on the diseases of wheat, in the Papers of the Bath Society, vol. xix. p. 83.

by a solution of copper, that substance not only destroys the germination of any smutty powder attached to the grain, but likewise prevents its being attacked, through the root, by any other parasitical plant that may be found in the soil, and thus enables it to escape other accidents, or disorders to which wheat is liable.*

The mode of using the blue vitriol, adopted by the gentleman whose name is not disclosed, was as follows: Into eight quarts of boiling water, he puts one pound of blue vitriol; and while it is quite hot, he mixes three bushels of wheat with five quarts of the liquid, and at the end of three hours adds the other three quarts: and the three bushels of wheat are suffered to remain three hours longer, or six hours in all, in the liquid. The whole should be stirred three or four times, during the six hours, and the light grains may be taken off. Then add a sufficient quantity of slaked lime, to make the wheat perfectly dry. It may remain in a heap for six hours; it may then be spread open, and used the next day, but not sooner. Though it is recommended to be spread six hours after it has been limed and put in a heap, yet there is no risk of its heating, and it may be kept longer than a day, without any risk of injury.

Mr. Hipkys's mode of preparation is different. After dissolving five pounds of the sulphate in hot water, he then adds as much cold water as may be sufficient to cover three bushels of wheat; which is gradually passed through a riddle in order that all the light grains may swim on the surface, and be skimmed off. After being repeatedly stirred, and cleared of the light grains, the wheat is suffered to remain in the liquid for five or six hours; but it has remained, in one or two instances, from twelve to twenty-four hours, without experiencing any bad effect. It is then taken out, and thrown upon the floor. If it is to be sown broad-cast, it should be crusted with lime in the usual way; but for drilling, it is stirred about until it becomes dry, which it generally does, in dry weather, in five or six hours. When the atmosphere, however, is moist, it will require double that space of time.† It may then be drilled, with as much facility as grain that had not undergone any operation.

After the first two or three bags, of three bushels each, have passed through this liquid, one pound of the sulphate should be added, for each succeeding bag, until from ten to twelve bags have been thus used; when a fresh quantity of the preparation should be made ready, in case the liquid should become foul or turbid.

Either of these modes may be adopted with a certainty of success.

This plan is surely superior, in point of cleanliness at least, to some of the disgusting processes that are frequently recommended for the same purpose, and is likewise attended by the following advantages: 1. The expense is trifling, as the price of the vitriol is not, in general, above from sixpence to eightpence or ninepence per pound; and after being used, in the manner above described, the water may be evaporated, and the remains of the sulphate will again crystallise. 2. It is a great advantage, that, with this preparation, liming is not necessary; as lime, more especially recently slaked, cannot always be had, and as the use of lime is so injurious to the drill machines, where brushes are used. 3. It is well known, that after wheat has been steeped in other modes, it has been lost by keeping; whereas, when prepared by the sulphate, it may remain unsown for any length of time without injury;* and, 4. The plant is thereby so strengthened, that it is less liable to be lodged, or to suffer from other disorders; and though it does not prevent the rust or mildew, yet for the smut, when properly applied, it is an *infallible antidote.*

In order to do justice to the application, the grain should be perfectly dry, when the solution of copper is applied. The germination of the smut plant will then be effectually prevented, without injuring the vegetative powers of the wheat.

It may be proper to add, that M. Prevost's discovery was, in a great measure, accidental; and that the utility of preparations from copper has long been known in Flanders. The method has also been successfully employed by Mr. Joseph Butler of Killamarsh in Derbyshire.† Mr. Brownrigg in the county of Wicklow in Ireland, likewise uses vitriol, and with success.‡

On this interesting subject, M. Desmazieres of Lisle, who has paid peculiar attention to the diseases of wheat, states in a recent communication to the author, that the Microscopic fungus which produces smut, (*uredo caries,*) attacks only the grain, which is entirely filled with it, and the powder, which was spread only in a very small degree before, remains in the grain when gathered and thrashed. Some means must be found, for destroying this contagious fungus, and this has been effectually brought about, by the various operations commonly made use of. How comes it then, it may be asked, that a field, where seed has been well prepared, should sometimes yield smutty plants? To this question it may be answered, that the seeds of rottenness, like those of smut, may be more or less scattered over the surface of the earth, at the very moment that the crop is cut down. Hence it follows, if we wish to obtain a

* Mr. Hipkys states, that he had a superior crop of wheat, which had been sulphated, and escaped being lodged, while the field of a neighbor, of equal quality, was beaten down, and mildewed. This he attributes to the superior strength of the straw. He is not of opinion, that the sulphate will prevent the mildew; all that can be expected from steeps is, that through their instrumentality, the plant may be thereby freed from a general aptitude to disease, and by being thus invigorated, it may be the better enabled to withstand those attacks, to which, in a less healthy state, it would be liable.

† Passing it through a pair of fanners would soon dry it.

* It would be a good plan, for seedsmen to prepare the seed wheat before they send it to their customers. Sulphated seed has been kept uninjured, in small quantities, from the 2d of November to the 24th of December.

† See Derbyshire Report, vol. ii. p. 116. He mixed two pounds of blue vitriol, in as much chamber-ley, as would wet twelve bushels of wheat, and after soaking, dried the wheat in quicklime.

‡ Report of the county of Wicklow, by the Rev. Thomas Radcliff, p. 256. Mr. Brownrigg dissolved only a quarter of a pound of Roman vitriol, in warm water, and mixed it with one barrel of sea-water, strengthened with a stone of salt.

pure harvest, that the earth itself ought to be purified, and that the ground to be sown or planted, should be covered with lime, or watered with a solution of sulphate of copper, before or after tillage.

DRILLED WHEAT—QUERIES.

To the Editor of the Farmers' Register.

August 7, 1835.

I received your last Register on the 5th of this month, by the way of Fredericksburg; and the communication from Prince George relative to the "blue stem wheat," reminded me that I had omitted in my late letter to mention, as I intended, an experiment which I also have made with the same kind, as I suppose mine to be, although in Louisa —whence it came, it is called "the blue straw."

Last fall one of my sons brought half a gallon of it from Louisa, in his saddle bags. Very late in October I drilled it in some land from which I had taken a crop of Irish potatoes. The vines had been buried nearly long enough to be partially decayed, between the ridges in which the potatoes had grown, and which had been manured with stable manure in the trenches. New ridges were thus formed between the old ones. These being flattened by chopping with the hand-hoe, received the wheat in trenches opened to the depth at which we usually sow garden peas, and the grain was covered by a garden-rake moved to and fro transversely. The drillers were directed to drop the grains about two inches apart, as near as they could guess; but the operation was not accurately performed. The ground was hand-hoed three times, and the drills hand-weeded twice; but all the plants were more or less injured by the fly, although no wheat had ever been cultivated nearer than two or three hundred yards of the spot since I could remember; and a still larger portion was destroyed by the frost, so destructive to wheat in every part of Virginia. Add to these disadvantages, there were five fruit trees of a medium size, growing among the wheat: still the half gallon produced 42 half gallons, weighing by the chondrometer 61 lbs. to the Winchester bushel, of such grain as I send you to enable you to determine whether it is the same that your correspondent calls "blue stem." Among the grains shattered out, where the sheaves lay previous to passing through Douglass' wheat machine, I found some grains of smut, although in the wheat sown I had not discovered any. I did not attempt to ascertain the number of square yards occupied by the drills, because they were unnecessarily as far apart (say two and a half feet,) as the potato ridges had been. That they might have been much closer, I infer from the fact, that upon each of three of the ridges I drilled three rows of wheat, which were, in every respect, equal to the single rows.

The land upon which this wheat was drilled, was not particularly fertile; nor do I think it would have produced, in the best season, more than twelve or fifteen for one, sowed broad-cast. Some idea may therefore be formed of the advantage of drilling, so as to cultivate wheat, over the broadcast mode of sowing. A single experiment, however, will not prove much; but I give it to you for what it is worth. Under another cover, I send you two selected heads, one six and a half inches long, and the other six inches; the average length I should say, was about five inches; but whether this was ascribable to the particular variety of wheat, or to its being drilled and worked, I cannot tell, as I never saw any of it before.

Since I wrote you an account of my skinless oats, I have seen one of my brothers, who informed me that he made five pints from fifty-seven grains planted in his garden, twelve by six inches apart, and twice worked with the hoe. From these two facts, I entertain sanguine hopes that we shall find this variety of oat far preferable to any other which we have ever cultivated.

JAMES M. GARNETT.

P. S. I avail myself of the present occasion to propound a few queries which I will be much obliged, either to you, or to any of your subscribers, or readers, to answer.

Is there any, and if any, what difference between the seed produced by the principal head of the carrot, parsnip, celery, and parsley, and the seed of the other seed-stems?

Should any part of the tap-root of plants having such roots, be taken off before transplanting them?

What garden plants, if any, will be injured if hoed before the dew is off?

There is a very prevalent opinion, which some ridicule as an idle superstition, that the seed of all root crops should be sown during the *decrease* of the moon, and that the seed of all other crops should be sown or planted on the *increase*. Have you, or any of your subscribers, or readers, ever made any experiments to ascertain how far this opinion is true or false, since, if true, it is a very important fact; and if false, had better be corrected by a detail of such experiments as prove it to be unfounded?

J. M. G.

[The queries above, it is hoped will be attended to by some of those who are enabled to give practical information on any of the several points.]

From the Genesee Farmer.

DISEASES AND ENEMIES OF FRUIT TREES.

The fact that many valuable fruit trees, and sometimes even whole orchards, are destroyed by diseases and insects, shows the importance of attention to the subject. A concise account therefore, of the various diseases and enemies to which fruit trees are liable, and the most efficient remedies which have yet been made known, may prove acceptable to young or inexperienced cultivators of fruit; especially as this information is now scattered through a great number of horticultural works, which perhaps are accessible to a few only. We therefore propose to give brief descriptions of the most formidable and common of these evils, and their respective remedies.

Apple.

The hardiness and vigor of this tree is such, and its enemies comparatively so few in the western part of New York, that little difficulty has been yet experienced in its successful cultivation. It has occasionally however, its evils to contend with. Among the most common are 1. Canker.

2. The Borer. 3. The Caterpillar. 4. The American Blight.

1. *Canker* is a disease ascribed to various causes. Some attribute it to poorness or wetness of the soil; others to the trees being exposed in a bleak situation to frosts and cold winds; but the most probable cause is external injuries sustained by applying ladders in gathering the fruit, leaving dead branches remaining on the tree, and by injudicious pruning. Where trees thus receive large wounds, decay frequently commences in those parts, and gradually extends until the tree dies. Wherever therefore wounds have been made, whether by pruning or otherwise, they should be protected from the air and moisture by a thick coat of paint or of a mixture of tar and brick dust. Where canker has actually commenced, either in apple or other fruit trees, the only remedy is to cut away, (with a drawing knife or other suitable instrument,) all the affected parts, protecting the freshly cut surface with a coating of paint, wax, or other similar substance. Canker is sometimes caused by pruning in the spring while the sap is in rapid circulation, as it then oozes out upon the wound, causing it to turn black and producing decay in the branch.

2. *The Borer* is an insect which perforates the wood at or a little below the surface of the earth. They may be taken out by means of a slender barbed wire, which can be introduced into the hole for this purpose. Where the hole is too crooked for this, soap suds, or a strong decoction of tobacco, injected into it, will destroy them. Whatever mode is adopted to destroy them, the operation should be repeated several times during the summer, in order completely to extirpate them.

3. *The Caterpillar* has heretofore been the most formidable enemy to the apple tree in western New York. It first makes its appearance in the spring, just as the leaf buds begin to open, when it is not the tenth of an inch long, and no larger than a cambric needle. It is then very easily destroyed by means of a brush dipped in some caustic or poisonous solution, as of lime, soap, or tobacco. It is destroyed with less ease as it increases in size. When fully grown it is two inches long and a quarter of an inch in diameter. It then spins a cocoon and passes to the pupa state, and in the latter part of summer comes out a brown miller. It then deposites its eggs near the ends of the smaller branches, in the form of a band or broad ring round them, each ring of eggs containing about five hundred. These may be cut off and destroyed at any time during the autumn or winter. Every ring of eggs thus destroyed, will prevent a nest of caterpillars the next season.

4. *The American Blight*, (so called,) is caused by the *Aphis lanata*, a small insect, so thickly covered with fine white hair as to appear enveloped in fine cotton; hence it is sometimes, and more appropriately, termed *white blight*. In England, apple trees have been greatly injured and sometimes destroyed by it. The insect is described as furnished with a fine bristel-like beak, with which it pierces the bark and abstracts the nourishment from the cambium or newly formed sap wood. The sap wood being thus wounded rises up in excrescences over the whole surface—this limb grows sickly, the leaves turn yellow, and the branch perishes. Branch after branch is assailed in turn, until they all become leafless and the tree dies. The insect spreads from tree to tree, by being carried on the wind by means of its long cottony tufts of hair. It is easily destroyed on young trees, and those older which have been recently attacked, by coating over with a painter's brush, the affected parts, with a mixture consisting of equal parts, by weight, of rosin and fish oil, melted together and applied warm. This prevents the escape of the insects and stifles them. The operation should be performed early in the season, or as soon as the hoariness occasioned by the insects, appears on the branches. As this insect has as yet been introduced into this country in but small numbers, it becomes important to watch it closely, and destroy it now at the outset before it becomes extensively spread. The application of soft soap has been recommended for its destruction when it first appears on trees from infected nurseries.

The canker worm is perhaps the most destructive insect to apple trees which has infested American orchards, but it appears to have been hitherto confined to certain parts of the country only, particularly of New England. It ascends the trunks of the trees in the spring and in a short time destroys all the leaves of the tree, and thus eventually causes its death. The most common method is tarring daily the body of the tree, during the season of its activity, and thus preventing its passing up the tree.

Quince.

The most formidable, and perhaps nearly the only enemy to the quince, is *the Borer*, which attacks the tree in the same manner as that of the apple. The same remedy is to be applied. It is said that the borer may be excluded by inclosing the lower part of the trunk in tan or unleached ashes during the spring months. Grafting the quince above ground on pear stocks, will also in a great measure save it from the attacks of the borer, as the pear is rarely touched by it.

Pear.

The pear, in common with the apple and other trees, is liable to occasional attacks from the caterpillar, and sometimes from a few other insects; but its great and peculiar malady is the *Fire Blight.* This first affects trees generally during the early part of summer, sometimes later, causing the branches and leaves suddenly to turn black and die. It is attributed to a very small insect (*Scolytus pyri*) which eats a small circular ring under the bark, round the branch, thus cutting off the upward flow of the sap. Where the insect has been discovered, it has been some inches below the affected part. The only remedy is to cut off the diseased branch immediately, at some distance below, and commit it to the fire. This course when faithfully and unremittingly pursued has been found entirely effectual in preventing the ravages of this formidable enemy of the pear. Some attribute the blight to other causes than the work of an insect, but all agree that the only effectual cure is to cut off and burn the limb.

Plum.

The principal enemy to the plum, as well as to all smooth stone fruit, is the *Curculio.* This is a small beetle or bug, about a quarter of an inch long, (its head and thorax resembling at first glance, a long beak, serving at once to distinguish it,) which punctures, and deposites its egg in the young fruit. A worm proceeds from this, which feeds upon the fruit, and causes it prematurely to fall to the ground; when the worm passes immediately into the earth, and continues (as is supposed) in the pupa state during winter, and the next season comes out in the perfect state to propagate its species by again puncturing the fruit. Now if, when the fruit falls, it be destroyed immediately, before the worm escapes, the fruit of the succeeding year will be saved. This may be easily affected by suffering a number of swine to feed among the trees to devour all that fall. But where swine cannot be admitted, the best way is to jar down the insects during the time of laying their eggs, by a stroke of the hand or of a mallet, when they may be caught in white sheets of cloth spread under the tree to receive them, and destroyed. Where this operation has been performed two or three times a day, it has soon cleared the tree of them.

The plum tree is liable to a disease sometimes called canker; which is an excrescence upon the branches, at first green, and afterwards becoming black; the diseased branch soon dies and the whole tree gradually perishes. It is prevented by cutting off all the affected branches as soon as the disease appears, and burning them. By seasonable care, it may thus be prevented from doing further mischief with little trouble.

A large number of plum trees in this state suffered greatly from some unknown cause, in the early part of the autumn of 1833. The leaves fell prematurely, in consequence of which the fruit was not perfected, and the trees themselves received a check from which many of them did not recover. A large number have since died; many however, perhaps the greater part, are now recovering, and some have resumed their former thriftiness.

Peach.

The peach is particularly subject to the attacks of of an insect called the *Peach worm*, and to a disease known by the name of the *Yellows.*

1. The *Peach worm* is produced from the eggs of a lepidopterous fly (*Ægeria persicæ*) which deposites its eggs during summer in the bark of the tree near the roots. The worms which these produce, penetrate the bark to the external surface of the wood, and commence the work of destruction sometime devouring the inner bark entirely round the tree, and speedily causing its death. It is rare however, except in very small trees, that death is produced, as the worm seldom eats completely round; in which case the injury only retards its growth. Its presence is readily detected by the gum filled with excrementitious matter, which oozes from the tree, near the surface of the ground. The best remedy is to remove the earth from round the foot of the tree, together with a small portion of the injured bark, when the worm will be exposed and may be readily destroyed. All the holes should be traced to their end, in order to to see that the tree is cleared of them, cutting the bark as little as possible so as not to injure the tree unnecessarily.

2. *The Yellows.* This disease is by far the most formidable evil which the peach has to encounter. It is entirely peculiar to the peach and nectarine. Its cause is unknown. It is first indicated by the fruit ripening three or four weeks earlier than usual, generally with red specks and blotches upon it. This commonly takes place on a part of the tree only. The following season, a number of very small wiery shoots grow from the larger branches, the leaves become yellow, the whole tree assumes a sickly appearance, and eventually perishes. What renders this disease the more to be dreaded is its contagious nature. If not checked it commonly spreads through the orchard. The infection is supposed to be communicated at the time of flowering by the pollen or farina which is carried from tree to tree; the fruit thus receives the malady, which is quickly carried by the circulation of the sap through the branches and trunk. The disease is also always communicated where a bud from an infected tree is inserted on a healthy one; and even by pruning a healthy tree with a knife which has been previously used on a diseased one. After it has once attacked a tree, there is no remedy; it must inevitably perish. Wherever therefore a tree is seen ripening its fruit prematurely, especially if that fruit be marked with red blotches unusual in it, it is to be looked upon as a lost tree—nothing can save it; and nothing can save adjacent ones from becoming infected but by destroying it before it blooms again. No peach tree should be planted on the same spot until several years of intermediate cultivation; perhaps it will be best in most cases to plant fruit trees of some other species, which are not attacked by this disease, in places where such peach trees have stood.

Nectarine.

This fruit tree is subject to the same diseases as the peach, of which indeed it is considered as but a variety; and the same remedies apply to both. Its fruit is also subject to the attacks of the curculio, for an account of which, see the article on the plum.

Apricot.

The principal enemies of this fruit, are 1. *The worm* or *Ægeria*, which has been described in the account of the peach; and 2. *The curculio*, described in the account of the plum.

Cherry.

In western New York, the cherry has but few diseases or enemies, and those of little importance. Some varieties are attacked by an insect which causes large excrescences on the branches. Whenever these appear, they should be immediately cut off and committed to the fire. Perhaps the greatest enemy is the *Cedar bird.** The only known way of repelling them is to thin their ranks by means of powder and shot, when they become suspicious and fearful, and less voracious in their depredations. Small trees of choice varieties may be protected from the birds by covering them with a large coarse net, made of bass matting or other material.

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* This is a small bird about the size of the blue bird, of a light brown color, readily distinguished by its crest: and is by its voracity very destructive to ripe cherries.

CORRECTION OF MISTAKES RESPECTING THE GROWTH AND SITUATION OF THE "MOUNTAIN LOCUST," OR ROBINIA PSEUDACACIA.

To the Editor of the Farmers' Register.

In your 12th No. Vol. II. of the Register, is an article on the "honey locust," (*Gleditschia,*) and "mountain locust," (*Robinia pseudacacia.*) Your correspondent H. B. C. says that the honey locust is a native of the alluvial portions of Virginia, and that the white or mountain locust is a native of the Allegany Mountains, and that this is the common opinion of all writers on the botany of North America. I see you differ in opinion with your correspondent, and advance another which I would hope to be correct, viz: "that this tree, the white or mountain locust, is seldom seen growing naturally on any soils, except such as contain a notable proportion of calcareous earth or lime in some form." You further say that it would be impossible to find a locust growing naturally, a mile from James River: but on river banks, and in ravines, where shell marl or other calcareous matters have affected the soil, it grows so abundantly, and in places least touched by the labors of man, that it is scarcely possible it could have been introduced from a distant region. (Vol. II. p. 710.) Two questions growing out of the opinion of your correspondent H. B. C. and your own views, are worthy of investigation, and facts may establish the correct theory on the subject.

Is the white locust indigenous to those portions of Maryland and Virginia bordering on the Chesapeake or tide-water? And

Does it when growing "*naturally,*" indicate the existence of calcareous matter or lime in the soil, where it grows vigorously and abundantly?

My limited experience as an agriculturist, has already satisfied me so thoroughly of the value of calcareous matter in any distinct proportion to the soil, that I deem it important to establish any facts that may indicate or prove its existence: and if your proposition be entirely correct, this portion of Maryland has not been properly appreciated, and its agricultural resources are susceptible of much more profitable developement. This portion of the state (I mean St. Mary's, Charles, and the lower parts of Prince George's and Calvert counties,) exhibits an uneven and irregular surface of plains and swamps, hills and valleys, intersected and watered by numerous creeks, streams, and tributaries to the Potomac, the Wicomico, and the Patuxent. The hills consist chiefly in diluvial deposites of clay, sand and gravel, varying in depth. The plains exhibit a similar formation, and the valleys are covered by alluvial deposites, being chiefly the decomposed vegetable matter washed from the adjacent highlands. Extensive beds of shells marl, strata of green sand, blue marl and gypseous earth, are found on the banks of the Potomac; and in some places on the banks, and in ravines contiguous to its tributary streams, marl is also found. The fossil deposites discovered, belong to the different tertiary formations distinguished by geologists into the eocene, miocene, and pliocene eras. There have also been discovered in digging wells, *secondary deposites,* containing bones and teeth of animals; but in no instance within my knowledge, have any researches in this section been prosecuted to the discovery of *primary deposites,* underlying the *secondary* formation of organic remains. Neither am I aware that in those places where shell marl, or blue marl, green sand, or gypseous earth, has been discovered in greatest abundance, in Charles, St. Mary's, or Prince George's counties, that any indications of a fresh water tertiary have been manifested. As far as opinion has been expressed on the subject by geologists, these calcareous deposites seem to be horizontal; and where discovered in other situations than on the immediate banks of the river, are covered by strata of silicious or argillaceous earth, of various depth—and when discovered in ravines, are covered by strata of sand or clay, containing in some cases, more or less decomposed vegetable matter.

In such places on the banks of the rivers Potomac and Patuxent, also on the tributary streams, and in ravines where marl has been discovered, or other calcareous matter, the locust grows most vigorously, and no man who is acquainted with its growth in this section, can hesitate to believe that it is native and indigenous. It is to be found on cliffs and in ravines where the labor of man has never been directed, and in too great abundance to admit the belief that it could have been produced from seed scattered there by accident.

But it grows equally abundantly and vigorously in those parts of our county, where there does not appear to be any marl or calcareous matter, or fossil deposite. There are few portions of this county, (Charles) where the locust does not grow in great abundance, and with surprising rapidity. It does not thrive well on that kind of soil which we commonly denominate cold, stiff white oak land—nor does any thing grow well on such soils. They seem to be incapable of improvement to any great degree of fertility, defying alike the efforts of skill, the labors of industry, and the improvements of science. But on the brittle, friable lands, containing a mixture of silicious and argillaceous earth, even remote from water courses, and where there is no indication of calcareous matter existing in the soil, and on those too which are very unproductive, the locust is found in great abundance, and when cut down is reproduced with surprising rapidity. It is indeed almost as common as oak or white gum, and perhaps much more than walnut or hickory. I would consider it of great interest to us to establish your position, that this tree, the white or mountain locust, (*Robinia pseudacacia.*) "being almost never seen growing naturally on any soils except such as contain a notable proportion of calcareous earth, or lime, in some form." I am not disposed to controvert the opinion, being too much interested in the truth of the theory, and solicitous for its being established. My ignorance of botany, and limited knowledge of geology, forbid my advancing views opposed to the opinions of men of science and observation. But the opinion expressed by you is certainly at variance with the general appearance of this county, and the character of our soil, as indicated by its agricultural and natural products.

The proposition that the white or mountain locust grows naturally and vigorously upon soils containing a notable proportion of calcareous matter, is no doubt true. But is the corollary or converse proposition equally true, that it does not grow naturally upon any other soils? It is known to you that recent geological examinations have thrown much light on the tertiary formation of this peninsula. Rich deposites of shell marl, green sand, gypseous earth, and fossil deposites are found underlying portions of the country between the Potomac and the Patuxent, and the Patuxent and Chesapeake Bay. But these deposites do not seem to underlie the whole country, or if they do, are in some parts too remote from the crust of the earth, for any indications to have been manifested, or appearances to be discovered. They are doubtless partial, running in veins, and are confined to the deep ravines adjacent to those tributary streams of the rivers which take their rise in the range of hills and highlands that divide the waters of the two rivers, and where the sources of the tributaries of each river are near to each other. But the locust is not confined to those sections, and as far as my recollection now serves me, the locust is much more abundant in those portions of this county, where no calcareous matter has been discovered, and where appearances do not justify the belief that any can be found. On my farm, the locust is more common than any other growth, except pine, cedar, and oak. It is impracticable to extirpate it when it is desirable to do so, and on cutting it down for posts or stakes, it is reproduced from the sprout or root, of the same size, in ten or twelve years. No appearance of calcareous matter has ever been discovered, and so far I have every reason to think that I am not within the range of any of the fossil deposites, or undulations, which pervade in places, and underlie this country.

There are strong reasons against the existence of calcareous matter in this soil, where the white locust grows so vigorously, and in such abundance. All agricultural writers, I believe, agree that phosphate of lime is an essential ingredient of wheat, and you remark in a note, page 129, July No. "that a quantity too small to cause much improvement in the soil, might serve to supply this essential food for wheat." If the soil contained calcareous matter in any notable proportion, it would yield the phosphate of lime requisite for this plant, and by the admixture and application of vegetable and other manures to the land, it would yield at least good crops of wheat. Yet wheat cannot be grown in this immediate section, to pay the farmer for the necessary labor attending it. Every mode of preparation, with every variety of wheat, fails to yield more than from five to eight bushels to the acre. Some of my neighbors who are experienced farmers, and esteemed judicious not only in the application of manures, and the great improvement of their lands, but in their whole agricultural arrangements and economy, assure me that on their best improved lands, they never obtain more than from six to ten bushels to the acre. What is wanting? Those lands produce tobacco, corn, oats and grass as well, and in as large quantities as the land in the marl regions of the country. But the prevailing opinion is, that they are not adapted to wheat. They certainly are adapted to locust. Do they not contain a sufficient quantity of calcareous matter to yield the necessary proportion of phosphate of lime for wheat? If that is the case, what becomes of the proposition, that locust is seldom seen growing in any soils that do not contain a notable proportion of calcareous matter?

The foregoing views are given with no expectation of affording information, but with the hope of eliciting the opinions of those whose experience and researches enable them to shed light on every question of science or physics, in which the interests of agriculture are involved.

J. G. C.

Charles Co. Md. July, 1835.

[The interesting facts stated by our correspondent, respecting the general and luxuriant growth of locust on soils of inferior quality, and apparently very deficient in calcareous earth, are in contradiction to all our experience. But they are entitled to the more attention on that account. With our imperfect lights, we have no idea of the cause of the remarkable difference.]

ON THE CULTIVATION OF MIXED CROPS.

To the Editor of the Farmers' Register.

Notwithstanding my practice of "mixed cropping" has taken up so much of the columns of your valuable Register,* I feel disposed to add a few remarks. And first, I am aware that my rotation will not meet the theory of your enlightened farmers, who contend for the most improving system. But it has been adopted by me on grounds that I feel disposed to believe ought to be always in view of the judicious planter. It has been adopted with an eye to the great, and now extremely valuable staple of our section of the Union, which our interest calls upon us to secure —the consumption of the country—a rotation system—and as far as I could, with these objects in view, the increasing fertility of the soil.

The corn crop, as in other parts of our country, is with us, truly important. To have then a full crop is the object with me—and I give it the first agency of the manure, but also because, in my rotation, it is the only one that, agreeable to my experience, as also that of many excellent planters, most decidedly feeds kindly on long, or but partially decomposed manure. The best evidence I can require is, the production. That evidence I get annually. I acknowledge that my manuring is uniformly a heavy one. It is immediately ploughed under, and is never fairly brought to the surface, during the cultivation of the corn crop. In fifteen years practice I have never had one crop injured, or burnt by the manure alone—and some dry seasons have passed over me. Whether your readers have noticed it or not, I have candidly given the manner of laying on the manure, to which, I believe, I stand indebted for a perfect guarantee against the usual fatal consequences of manuring being followed by a dry season. It will be seen that I throw into the soil along with the animal excrement, (and even that given in the form of a compost manure, embracing a mixture of every fertilizing production of the farm,) a great quantity of vegetable matter, in its green state, and swamp mud. The addition of lime, applied in the northern manner, I deem a farther security against the effects of drought, as also another source of fertility.

The manner in which I apply the swamp mud, requires some explanation. It is partly the pro-

*Page 631, Vol. II.

duction of a view to economy in labor, but also a belief that the agency of the mud is brought sufficiently soon into action for the benefit of the plant, by its combination with the manure in the earth; and on this ground I make the one moving of the mud suffice. Of its superior value when combined with manure and lime, repeated and carefully conducted experiments have satisfied me. Here I must apologize for saying, that twenty years of my life I have been, as opportunity offered, endeavoring to settle for my own benefit and satisfaction, what I believe is at this moment, the point least understood in the whole range of agricultural pursuit, viz: the most judicious formation of manure, and the mode most efficient of applying it. I am aware of the mass of talent, practical and theoretical, that has been applied to this subject. About the time before mentioned, the "food of plants," agitated the agriculturalists of England, and the United States. I read Ingenhouse, Young, Kirwan and Davy, Peters and others, until I found that I knew nothing about the subject, but that it was necessary for my limited intellect to pursue it by actual experiment, making the best use I could of the mass of contradictory theory that I had gathered.

The foregoing detail of my method of forming and applying manure, or other fertilizing matter, will give a practical view of the theory I settled down upon, while the ears of corn, and the weight of the grain, have left me satisfied, so far, with the practical application of my adopted theory. If I can effect it, I will certainly forward you a specimen of the ears of corn I produce—the corn planted five feet by four, and four stalks left in the hill—with the accompaniments mentioned in my detail of the corn crop. A specimen of such rice as I make on high dry upland, with the corn, was forwarded by mail.

I have said that corn, above all grain crops, accepts of long, or but very partially decomposed manure, and feeds well on it. Cotton, the next in my rotation, will not do so—but the next year, (after the manure is put into the soil, and undergoes the incorporation with the soil that is produced by the cultivation of a crop, and the other effects that follow that incorporation and cultivation,) this plant, with us, is found to do remarkably well, producing a heavy crop—and so with the rye and oats. The mode of cultivating the corn crop, as detailed by me, admitting and remunerating me well for a garden cultivation, completely prepares the ground for an easy and successful cultivation of the cotton plant. A moment's reflection will compel the acknowledgement that the ground has all the requisites for the successful cultivation of the last—the ground well filled with fertilizing matter—that matter in the state which experience has proved to be the happiest for the production of cotton—grass and weeds rooted out by the previous cultivation—and the very seeds of them in a great measure destroyed—the land loose and mellow, and a good deep coultering, or stirring with a long Scooter plough previous to planting the cotton, by the operation of which, the soil is prepared for a plant that projects its main root deeply into the earth.

Rye, the *white*, a most valuable species, does admirably after the cotton. It is sown in December or January, generally the last, and if the cotton stalks are not pulled up and deposited in the dungstead, to undergo the action of the feet of cattle, and become saturated by the liquid part of the manure, (the last much preferred,) they are beaten down with sticks, the operator striking in such a manner as to produce the best effect, in reducing them to small pieces, and which last operation, prevents them from being in the way of the cradle. In turning in the stubble, the broken cotton stalks, with other offal of the cotton plant, go into the earth, to help out the peas, sown previous to turning under the stubble, or harrowed in afterwards.

The admirable preparation which a cotton crop is found to be for corn, is I believe, generally known—but I have found it not less a valuable preparation for small grain, and a pea crop.

The oats crop, the next, and last in the rotation, I know, is "not agreeable to Hoyle," and I am persuaded, I will be told, "they order things better in France"—and the only apology I can offer is, that the state of things makes it necessary, and that we possess a most superior climate for the cultivation of that grain, and of the "Egyptian oat," make admirable crops—the stubble of which turned in on the pea, again produces an equally desirable crop of that valuable plant. Where other more important objects prevent saving the pea crop, as before stated,* by pulling up the vines, and curing vines and peas together, a profitable plan has been formed in feeding off the peas with hogs, and turning in the mass of vines early in the spring, and which four turnings in, viz: the stubble of the rye, and the following pea vines, and the oats stubble, and its following pea vines, will be acknowled to be, as it has been found a rapid fertilizer of the soil. The cultivation of the black, and red tory pea, suits this last course well, those peas not being affected by wet spells of weather. In my rotation it will be seen that one manuring is relied on to secure that rotation—while I rely equally on the mode of cultivation, for the duration of the benefits of that manuring—and further, that the rotation observed, is a *manure-making one.*

In the choice of plants to accompany the corn crop, gross feeders are selected, and rice is chosen as one, not only because it grows well in this way, appears not to affect the corn in any unfriendly manner—feeds well on any thing that corn receives benefit from—but also because it is one of the most valuable grains that the earth produces, whether we consider the value of the grain, or forage it yields. It adds singularly, if well managed, to our comfort, and I discover that my cow, or horse, or mule, or ox, appears to enjoy well saved rice straw, as much as I do well saved rice pudding, or bread. The pea feeds kindly on manure in any stage that corn will. The sweet potato is not choice of food. From repeated trials, it may be raised well in the very hill with Indian corn, without, apparently, affecting the corn crop, especially when the "gold dust" is well applied—particularly the bunch and red potato. The pindar or peanut, has long been raised with us in the hill of corn. That it produces any bad effects on the corn has not yet been even suspected. The removal of the corn, as before stated, gives to the last mentioned three items especially, a full opportunity of exerting their productive powers.

*See Farm. Reg. p. 92, Vol. III.

Generally I am able to remove my corn crop, during the last week in July. I have set out vines at the same time, and made excellent sweet potatoes. When the corn is removed, every article left has a distance of five feet apart in its rows. Admit the theory of different plants drawing from the earth different nutriment: and further from reason and analogy, no collection of plants brought together could, apparently, require more [illegible] diet. The fact is, it is [illegible] tion of the north, brought into [illegible] supported by a [illegible] course, and good cultivation.

The next year I shall plant [illegible] four, and four stalks in the hill, with [illegible] of rice, twelve inches apart in the [illegible] six feet—dropping four peas [illegible] of the bunch kind, between the four feet hills. Where no rice is planted, I shall drill two rows of the bunch pea, on the last ploughing of the corn, and give them a working after its removal. This last pea bears profusely, a large white pea, with a black eye, a long pod, and almost no vine. Still it furnishes when pulled up and cured, a great production in forage, of superior quality, and comes off in good time for the ruta baga or the large English turnip.

I will conclude by remarking, that I [illegible] without the anticipation that my plan [illegible] ting land will alarm incredulity, and [illegible] produce strong suspicion that it is [illegible] consequence is not uncommon, on the first suggestion of things, out of the beaten track. When Oliver Evans first announced his belief that in a few years wagons would be propelled by steam, he was deemed a visionary lunatic, by many who laid strong claims to superior mechanical talents, and profound knowledge of chemical science. But Oliver's wagons are now going, and successfully. In the course of human affairs, it appears that all men who pursue any object with a zeal proportioned to its importance, and who are fortunate enough to succeed in producing valuable improvements, have a tax to pay to certain minds—and for my part, when this tax amounts to no more than incurring a portion of doubt, or provoking a few sneers, I pay it cheerfully, reconciling myself to the circumstance, with "*nous verrons.*"

AGRICOLA.

Alabama, July 1, 1835.

ON SECURING THE CORN CROP, AND THE VALUE OF ITS OFFAL.

To the Editor of the Farmers' Register.

The value of the corn crop, no citizens of the United States know better, or are more willing to acknowledge, than those of Virginia. If they are sincere in this acknowledgement, it will be unnecessary to use many words to prove the propriety and good sense of endeavoring to find out the most economical and judicious mode of saving, not only the grain, but benefiting themselves by the offal, or forage it affords. While it gives a great mass of food of the "*ruffage*" kind, it certainly aids astonishingly in the production of manure. But these are not all the advantages that the cultivation of this grain claims. If it can be removed off the ground in time for other crops to succeed in the same piece of ground, and in the same year, it is no small addition to its claims on the agriculturist. If the forage part of the corn crop can be saved with less labor, and more of the nutritive principles secured in every part of it, then the plan ought to be adopted. That there is nutrition in every part of the plant, the course of our animals tells us at once, when the cow, and indeed the hungry horse, and mule, will devour with avidity, the bleached remains in the field. If any [illegible] of fully ascertaining the value of the [illegible] of the corn plant as a food for animals, let [illegible] the blades, shuck, and stalk, in the manner I have practised, and the detail of which I have given [illegible] the whole to the cutting box, permit the cut stuff to absorb during one night, the liquid preparation I have also pointed out, and feed on it. But they will also discover, that every acre of corn furnishes a prodigious mass of food for animals, when thus economically husbanded. Aware that thousands of corn raisers are perfectly ignorant of the real extent of the advantages to be derived from this plant, judiciously managed, I would respectfully suggest to them, that thousands of planters are saving their corn crops in this way annually, with the saving also of a vast amount of labor, loss, and to much grain—and request, that during the ensuing corn saving season, they will give it a fair trial, taking the following course. As soon as the corn exhibits blades that require curing, pull them off, and cure, which will generally be found to be but few, until the shuck turns yellow, and the corn exhibits a glazed appearance, with considerable hardness. By this period it will be discovered that the remaining blades, and tops, call for saving; and let this be the period of cutting down the stalk at the ground, and shocking on the ground, or hauling out of the field as cut, and shocking in an enclosure adjacent to the barn yard or place where it will be wanted to feed away, with most convenience. There remains no doubt of the singular advantage of steaming, every part of the refuse of corn, even the cob—if it can be done—if it cannot, the cutting up, and letting it become charged with the preparation I have suggested, will amply secure, in its effects on the cattle, the suffrage of the planter who will try it.

I have found the curing process aided by shocking about fifty to sixty stalks in the shock, and as far as one hundred, if the shock is made, only observing to spread it well at the bottom, tying at top with a handful of rye straw, and permitting the but-end of the stalks to press into, or even against, newly ploughed ground. If the weather is what may be called dry, let those shocks stand about ten days—if wet, say twelve: and it matters not if the corn is cut and shocked in a slight rain. My experience of years, would prefer it.

On taking down the shocks to put away, the corn may be pulled off, and cribbed. And if the stalk is to be cut in the box, I prefer shucking at the time, letting the shuck adhere to the stalk, for the saving of time, and convenience of cutting up. In all cases I sprinkle salt amongst my corn when cribbing, whether shucked, or put up in the shuck—as also every species of grain, "*ruffage,*" and hay, when I stack, that I put up for winter provender. It is too late in the day to question, or be even ignorant of the advantages of this

* See page 631, Vol. II.

course. After taking off the corn, the stalks, &c. may be preserved in the old fodder house mode. But for the preservation of every thing I prefer the board shelter, and open barn. It is true economy, and that is to me sufficient.

Mr. Editor, I am persuaded you will, and I know some of your readers will, require an apology for taking up so many of the pages of your (if it could be got into the hands and heads of our agricultural population,) invaluable Register on this subject—and to you, and them, I will say, that I have received so much valuable information, consequently gratification, from the communications it contains, that I am anxious to discharge, if but a part of the debt I owe. If I cannot give *coin*, I am willing to give all the "*proc*" I have.

AGRICOLA.

Alabama, July 21, 1835.

[It is regretted that the foregoing observations on securing the corn crop, by cutting off the entire plant, could not have been published in time to permit the process to be tested by experiment The communication was received late in August, and when all the space of the September No. was occupied. This mode of harvesting the entire corn crop has been long practiced successfully in some parts of the north and west, with the small and hard-grained corn raised in those colder regions. We infer (from his incidental remarks) that this is the kind of corn cultivated by our correspondent. If so, we should be glad to learn whether he has tested fully by experiment, the disputed point of the small northern corn being equally productive, in the south, with the larger and softer grained kinds. The answer furnished by our experiments would be in the negative—though perhaps they were not sufficiently varied to be conclusive. We have also tried frequently, and with various success, the mode of saving fodder as well as corn, by cutting off and putting in shocks the entire plants—and have thence formed the opinion that the plan would not answer with the soft grained corn, even if always safe for the hard kind.]

TREATISE ON IRRIGATION.

Extracted from the Practical Irrigator and Drainer.

By GEORGE STEVENS,

Land drainer, and member of the Nerician and Wermlandska Agricultural Societies, Sweden.

[In the following pages will be presented to the reader the whole of the latest and most approved English work on an important branch of agriculture, of which very little correct knowledge or practice exists in this country. The complimentary manner in which Mr. Stevens' labors have been spoken of in the late agricultural reviews, induced us to send to London for this work, which issued from the press only within the last year—and to lay before our readers this portion of it, (which has no immediate connexion with, or dependence on the after part,) as soon as the engravings could be procured.

The great cost of irrigation, as stated of various different operations, may so startle the tillers of our cheap lands, as to forbid all desire of adopting the most perfect and productive methods. But it may be seen that the returns are much greater than the necessary outlay, and if that would be also certainly the case in this country, the amount of the cost per acre is of but little importance.

In our mountain region, watering meadows has long been practiced, and with success and profit. Still, we infer that the plans used are very imperfect, and therefore are far less productive than such as might be substituted. There may not be many situations in this country (under present circumstances,) where irrigation is advisable to be used; but if proper to be practiced at all, we presume that a correct method will be more profitable than one either not founded on correct principles, or imperfectly executed.

There is another consideration well worth attention. Great and valuable as have been the products of irrigation in England and Scotland, they are not to compare with those of Upper Italy, the south of France, and of Spain. A cool and moist climate renders this improvement less necessary, and therefore less profitable in the former countries, than in the latter, which are comparatively hot and dry, and where water alone will cause land to yield exuberantly, which without such aid, would have been a hard and naked clay, on perhaps shifting sand. These changes from barrenness to fertility, caused merely by the application of water, are still more numerous and remarkable in Asia and Africa, under a state of agriculture which in all other respects is wretchedly defective. The dryness of the climate and soil of the hilly and mountainous regions of Virginia, (which only are fit for profitable irrigation, causes a greater similarity to Italy and Spain, than to Great Britain—and therefore it may be fairly presumed that the increase of product from irrigation in Virginia, and still more farther south, would be proportionably greater than in the lands described by our author.

The remainder of the *Practical Irrigator and Drainer*, treats of other and detached though kindred subjects. The principal one is vertical draining, by boring, on the plan first discovered and successfully practiced by Elkington. This method, excellent and admirable as it is for Great Britain, would be but of little practical use in this country.]

Preface.

The following treatise on irrigation was drawn up and published at the request of those for whom the author has had the honor of converting land into irrigated meadow, in order to point out, in a practical manner, the different methods of their formation, and, more particularly, what was necessary to be attended to in their management, as well as to show the result of experiments made in Scotland in this useful branch of agriculture. It having gone through two editions, which are now exhausted, he is encouraged, by the success which has attended them, and the work having been frequently asked for since it was out of print, to bring forward a third edition, which he hopes will not be unacceptable. An account of several other experiments has been added in this edition, with letters from proprietors and tenants, showing the expense of the operations and the results which have attended them, which will clearly prove the great advantages to be derived from an improvement that has now become much more generally known and appreciated, and is daily gaining ground, not only in this country but in others—indeed there can be no doubt that, in a few years, it will be put in practice in all situations where it is eligible.

General principles of irrigation.

To investigate, by observation or experiment, the processes of nature is the object of physical science: to imitate or regulate these processes is the object of art.

It is apparent to the most superficial observation, that the banks of rivers, which are *overflowed occasionally*, and the places contiguous to springs, over which their waters continue to *flow*, are ever covered with a conspicuous verdure of the sweetest grasses, while *stagnant water* converts the land on which it lies to marsh, productive of nothing but coarse and unpalatable aquatic plants.

To imitate this process of nature constitutes the leading principle of the art of irrigation.

Water is brought over the land in a constant current, so gentle as not to endanger the tearing up of the soil; and, at the same time, is all discharged, so as to permit none of it to become stagnant; and, to gain these purposes, the land must all be formed into a proper shape, both for admitting and discharging the water.

In this, as in every other art, long practice leads to perfectness; previous errors are thus detected and amended, and new improvements are suggested and brought to the test.

The agency of water in the process of vegetation has not, till of late, been distinctly perceived. Dr. Hales has shown that, in the summer months, a sun-flower, weighing three pounds avoirdupois, and regularly watered every day, passed through it or perspired twenty-two ounces each day, that is, half its weight. Dr. Woodward found that, in the space of seventy-seven days, a plant of common spearmint increased seventeen grains in weight, and yet had no other food but pure rain water; but he also found that it increased more in weight when it lived in spring water, and still more when its food was Thames water. The next most important ingredient to the nourishment of plants is earth, and of the different earths the calcareous seems the most necessary, as it is contained in rain water, and, absolutely speaking, many plants may grow without imbibing any other. Earths enter into plants in a state of solution when suspended in water in a state of division, as minute as if they really had been dissolved; that silicious earths may be suspended in such a state of division appears from various experiments, particularly those of Bergman, who found it thus diffused in the purest waters of Upsal.

One mode of its operation is, indeed, sufficiently obvious. When brought over a meadow in such a gentle current as to allow it to deposite sediment, but, at the same time, so as never to stagnate, the sediment deposited from the water in its filtration through the grass must greatly enrich the soil.* And hence much more efficacy may be expected from the waters of the large rivers, draining extensive tracts of rich improved soils, than from springs which receive no washings from surrounding lands, or from rivers running through tracts of mere mountainous pastoral districts of poor and unimproved soil; although, even in such districts, considerable quantities of enriching sediment may be expected from the waters of such rivers, if care is taken to have the meadow in a proper state for receiving the waters of the first flood after summer, which will wash down and carry along with them the droppings fallen from animals grazing upon the tracts of country which such rivers drain.

Another mode of the water's operation upon a meadow, is by protecting the grass plants from the effects of the winter frosts: for it is evident that water requires more severe frost to freeze it when in a current than when in a stagnant state; and it is equally obvious that fluid water retains a higher temperature than ice or hard frozen earth. So long, then, as the frost is not so severe as to prevent the water from maintaining its currency over the meadow, the grass plants will be maintained in a higher degree of temperature than if exposed uncovered to the air.

It would appear, then, that irrigation acts upon the vegetation of the irrigated meadow chiefly, I should presume, from the deposite of manuring sediment; in the next place, by shelter afforded to the plants against severity of winter frost, and from the decomposition which the water undergoes in filtering through the grass.

The best effects from irrigation may therefore be expected when the irrigator can obtain his water from the larger rivers, draining a large tract of fertile and improved soils, or from those streams which receive the drainings of great towns. Considerable improvement may, nevertheless, be expected from waters which drain considerable tracts of mere unimproved pasture lands of inferior soil, which, at any rate, will afford winter shelter; and, if advantage is taken of the earliest floods after summer, will yield also considerable quantities of enriching sediment. Nor is the irrigation from mere springs to be neglected, in regard to the smaller patches of land which they are capable of overflowing—in as much as their superior temperature to that of running water longer exposed makes them capable of affording warmer and more kindly shelter in winter—with-

* All rivers, from the least to the greatest, waft earth to the sea, and that in proportion to their magnitude, velocity, and length of course, combined with the nature of the soil which forms the beds and banks, and with the rains, which, in proportion to their violence and the degree of slope of the higher grounds, wash down the soil into the nearest stream. Mr. Rinnel says, that the quantity of alluvial soil wafted into the sea by the waters of the Ganges, is a two hundredth part of the whole volume, or 2,509,056,000 solid feet per hour. The alluvial soil deposited by the waters of the Nile, is the one hundred and twentieth part of the whole volume, or 14,784,000 solid feet per hour.

The Mississippi deposites 8,000,000, solid feet per hour, and the river Koangho, according to Barrow, carries into the sea 2,000,000 solid feet of sediment every hour.

Although these facts had been witnessed for several generations, it is but of late that the attention of philosophers has been drawn to this subject.

out taking into consideration the deposition to be obtained from all water however apparently pure, or that decomposition of its elements which it undergoes.

Many errors still prevail in regard to irrigation, which have a tendency to raise a prejudice against the system itself, from the disappointments those have felt who have proceeded upon wrong principles, either in the original formation of their meadows or in their subsequent management of them. While some conceive that every kind of water should have equal effect upon equal soils, or that its efficacy should yield equal returns from the poorest as from the richest soils, others esteem it sufficient merely to bring water upon the land without regard to its continuing to run or to stagnate upon it; and others overstretch their water, spreading it over such a large portion of land as it cannot cover in a body sufficiently deep to afford the plant an adequate winter shelter; *and lastly, others conceive that, if the meadow has been once regularly formed, no further care of it is necessary, although it is obvious that, by the continued action of the water, alterations may be made upon the feeders and dischargers which may render them, if not corrected, unfit for the purposes they were designed to accomplish.*

In the following pages I shall chiefly state the object held in view in the irrigating system, as practised in Gloucestershire and Wiltshire, where the system has the longest prevailed and with the best success, and in other places where it has been introduced more lately, together with the means by which these objects are endeavored to be effected.

Formation of water meadows.

Before I begin to point out the particular mode of forming an irrigated meadow, some questions will be necessary to be proposed: such as, will the stream of water to be used in irrigating admit of a dam across it? can you dam up the water high enough to run over the surface of your land without injuring your neighbor's land? or is the water already high enough without a dam? or can you make it so by diverting it out of the stream higher up, and, by a conductor, carry it nearly level till it enter the meadow? and can you draw it off your meadow as fast as it is brought on, without being stagnated on the surface? This should be particularly attended to in the formation of every irrigated meadow, for experience shows that wherever water is allowed to lie on the surface for any considerable time, the finer grasses disappear, and the whole surface, in a very short time, will be completely covered with nothing but stinted aquatic plants. Another precaution in the formation of an irrigated meadow is of the greatest consequence, I mean *draining;* for unless a piece of land that is to be converted into water meadows be properly drained, although the surface be ever so nicely formed, at the greatest expense, and the richest water applied, the crops of grass or hay will be very inferior to what they might have been had the ground been properly drained; therefore every irrigator, before he proceeds to the execution of any of the works, should first determine whether the drains that are necessary to carry away the water from the meadow will be sufficient to free the soil from all subterraneous water, otherwise arrangements must be made to that effect. Where you are free from all objections of this nature, your first operation is to take an accurate level of the ground intended for irrigation, and compare the highest part of it with the height of the surface of the water to be used. Having found the surface of the water in the river to be eight, twelve, or twenty inches higher than the surface of the ground in the intended meadow, which lies at the distance of one, two, or three hundred yards, cut your main conductor or main feeder, from which all the inferior feeders branching from it are to be supplied, as straight as circumstances will allow, directing it along the highest side of the field intended to be watered, so that the separate ridges into which the meadow is to be divided may have an equal slope from it to the discharging drain, keeping up its banks, not on a dead level, but with a gradual descent from one end to the other, giving the whole length an equal degree of fall, and then every drop of water will be kept in equal and constant motion.

Sometimes the surface of the land has two or three considerable swells higher than the rest; it will then be necessary to give each side or part its respective conductor, with feeders branching from them, which will be found, whatever be the form or situation of the meadow, to be competent to effect a true distribution of the water over the whole surface of the land.

The breadth of each main conductor depends upon the quantity of water it is to convey, the descent from the bottom of the stream to the surface of the ground intended for meadow, together with the number and length of the feeders which it is to supply with water. The depth of the conductors, at their junction with the stream or river supplying the water for irrigation, should be regulated by the depth of the stream or river, and the lowest part of the land; i. e. it should, if the surface of the land will possibly admit, always be made as deep as the bottom of the river, by which means the water will carry a larger quantity of mud with it from the bottom of the stream.

The stuff taken out in forming the conductors is used in forming the banks; or where not wanted for that purpose, in levelling any inequalities on the surface of the meadow.

To give the meadow a proper command of the water, it is requisite to place a sluice in the mouth of each main conductor, in order to admit or exclude the water at pleasure; and in droughty seasons, when there is not water enough for the whole at one time, the manager will thus be enabled to confine the water to any one part at pleasure; likewise, by paying attention in building in the sluices according to the height of the different swells of the ground, a considerable sum of money might be saved in many situations; for, instead of forming all the beds or ridges into one common level, they can be formed according to the different swells. All sluices should be built in with hewn stone and lime; wherever this has been neglected, I have always found the expense of continual reparation to have been much greater in a few years than what it would have been if the work had been substantially done at the first formation.

The next part of the process is to make the main drain, which is to receive and carry off the water after having irrigated the ridges into which the meadow has been divided. If the stream or river, by a crook in its course, happens to run along the lower end of the meadow, all the irrigating water will fall into it from the ridges, and it will act as the discharging drain; but when the river itself does not afford that advantage, a main drain must be cut along the lower end of the meadow, which will receive the whole water irrigating the meadow, and discharge it into the stream or river. This drain should always be made of the same dimensions as the large conductor, and deep enough, when the meadow is under full watering, to carry the whole off without allowing any of it to stagnate and sink into the soil; for in a well-formed meadow, where it is not allowed to stagnate, less of the water will sink in the soil than is generally imagined, especially when it is muddy: it will then leave a considerable quantity of sediment on the surface, which acts as an impervious covering, and pevents the water from sinking into the ground.

The stuff taken out forming the main drain is now used in filling up low places. The next part of the process is to divide the portion of land for meadow, which is assigned to each conductor, into regular beds. Where the soil is naturally dry, and the supply of water plentiful, they might be made forty feet wide; but when the sub-soil is naturally cold and impervious, their breadth should never exceed thirty-two feet, and even less in deep mossy soils. The feeders are made in the middle of the beds, always branching out at right angles from the conductors, except in cases where the ground falls two ways, when it will be necessary to make the feeders a few feet (or according to the fall of the ground) nearer the one drain than the other, or more on one side of the bed than the other. A bed two hundred yards long will require a feeder where it leaves the conductor twenty inches wide, gradually decreasing in width to twelve inches at the farthest extremity, (see plate 1.) for the quantity of water becomes less and less by overflowing constantly over the sides.

The earth taken out in forming the feeders is to be placed on each side, in such a regular manner as to form small banks with a gradual descent towards the drains. In forming the feeders, care should be taken to leave stops (small portions of solid earth) in them about six inches wide at regular distances from each other, or according to the fall of the ground, to obstruct and keep up the water to a proper height, so that the whole length of the bed may be regularly watered, without the assistance of notches, as recommended by Wright and others; indeed the contraction in the width of the conductors and feeders serves to raise the water over their sides, but this is not sufficient where the descent is considerable. Stops and notches have been thought indispensably necessary in the formation of water meadows, therefore several writers on the subject have recommended stakes to be driven into the conductors and feeders, to retard the velocity of the water. But if a water meadow is properly laid out, few stops will be wanted; and, in situations where they cannot be avoided, the best method is either to put in a few stones, or pin down a tough sod or two, taking care that the heads of the pins do not stand above the surface of the water otherwise they would be apt to collect any weeds that might be carried down with the water, and thereby retard the regular distribution. Wherever notches are found in a water meadow, it is a sure sign of an imperfect formation.

Having completed all the feeders which are necessary to introduce and spread the water, a drain must be made between every two feeders, parallel to and equidistant from each, that is, if the levelness of the land will permit; but if the surface of the ground falls two ways, which is often the case, the drain must be made as before directed. The drains are made in an order which is the reverse of the feeders; they are narrowest at the upper part of the meadow, and gradually increase in width, as is represented in the plates, till they descend into the main drain, which returns the water into the original channel. The depth of these drains, in all soils, should be so regulated that they free the surface from the stagnated water; but in moist soils, with retentive sub-soils, the depth at the upper ends should never be less than six inches, and increasing to nearly the same depth as the main drain where they discharge their waters, and the width exactly the reverse of the feeders.

Having thus completed the formation of the various conductors, feeders, and drains, let in the water, and, after having given each part its due, and regulated the stops in the feeders, beginning with the one next the head or upper part of the meadow, and continuing the same way over the whole, till the water runs an equal depth over the sides or bank of the conductors and feeders, it will very soon show such places as are too high, or hollows necessary to be filled up.

The stuff taken out in forming the drains, with what is gained by reducing high places, is generally enough for levelling the beds, to keep the water in constant motion; but the nearer the beds are brought to an inclined plane, the better for the purpose of irrigation; therefore, when the land is very unlevel, with a thin sward on it, I would recommend every proprietor to plough the whole and take a crop of oats before forming it into a water meadow; or, if the sward of grass is strong enough to be lifted, to lift the turf and form the sub-soil with the plough and spade, and lay the turf down again. In either of these cases the beds should be raised about twelve inches in the centre. Whenever the whole surface of a piece of the ground is broken to be constructed into an irrigated meadow, the formation should be done with the greatest nicety, for the greater the pains that are taken in the first forming, the easier the management will be ever after. Land that has been laid down with grass seeds requires from two to three years before it will be sufficiently swarded for the admittance of water; but when the turf is taken off and laid down again, the water should be put on immediately; and if the work is done in autumn, it cannot fail to give a very great crop of hay the first year. Several meadows have lately been formed in this manner, and have given general satisfaction.

As the rivers and brooks in this country are generally very rapid, all dams across them should be avoided as much as possible, by taking the water out of the stream farther up, although the expense should be considerably more; but especially when there is the least possibility of a neighboring proprietor's or farmer's lands being injured, or he should imagine he might receive damage by such an erection, although no real injury be done. It will always be advisable to put nothing in a neighbor's power; for, although there are many proprietors and even tenants who would not only be happy to concur in any real improvement of the country, but would even sacrifice a trifle before they would think of throwing impediments in the way, yet the reverse is the case in some instances, where, either through malice or some private design, they try to balk what they have not in their power to do themselves, or have not sufficient energy to perform.*

Where necessity obliges you to erect a dam, every care possible should be taken to make it as substantial as the nature of the site will admit of; for should it once blow at the bottom, or the water penetrate round the ends, the whole erection will be lost, and the rebuilding will undoubtedly cost three times the first expense.

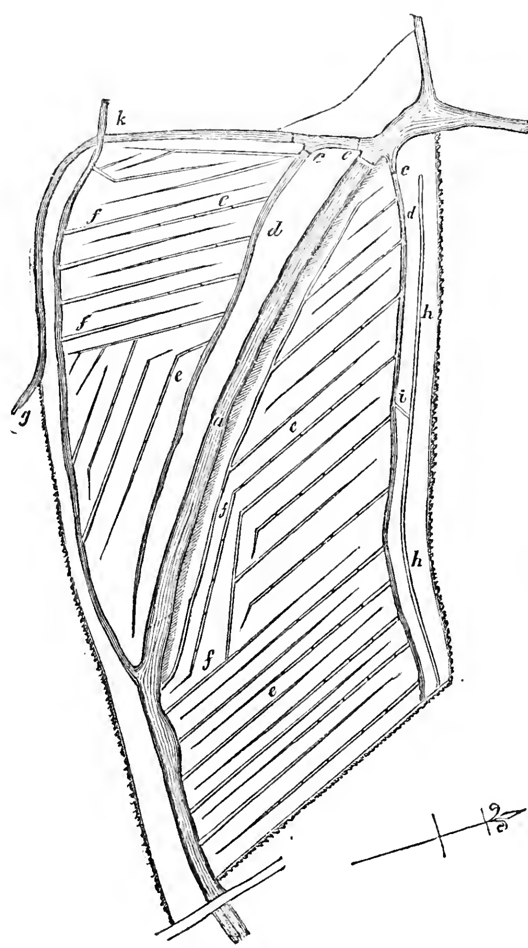
There are few pieces of land where the natural descent of the surface will not admit of the water being collected a second time, and carried to a lower part of the meadow, and there used again. Where the water is scarce, this should never be neglected;* but where there is a constant supply of good water, this precaution is unnecessary. In others, again, it is necessary to carry the water over a hollow place, by means of what the irrigators term a carry-bridge, (aqueduct,) to a higher part of the ground, which is either made of wood, iron, or stone, high enough to carry the water to the highest place required.

[To be continued.]

* This is not an imaginary supposition, for several cases of this kind have fallen under the author's observation.

* In a water meadow I made for his Grace the Duke of Athol in 1827, containing thirty English acres, part of the water is caught and used three successive times. The operations are so arranged that when the water leaves the meadows it can be collected and carried over another tract of equal extent, which his Grace is intending to do at some future period.

Plan of a Water Meadow belonging to William Loch, Esq. of Rachan, Peebles Shire.



a *Biggar Water.*
b *Dam.*
c *Sluices.*
d *Conductors.*
e *Feeders.*
f *Drains.*
g *Conductors to other fields.*
h *Back drain to cut off spring*
i *Waste water drain.*
k *Carry Bridge.*
Stops in the conductors and feeders.

From the Farmer and Gardener.

CLOVER AND ITS FERTILIZING PROPERTIES.

In a recent conversation with Mr. Robert Sinclair, Senior, upon this subject, we observed to him, that in crossing a clover field a few days previously, we were more convinced than ever, of its capacity for restoring worn-out lands, by the immense vegetable deposites which we saw in a state of rapid decomposition; that no matter how carefully a crop of clover might be cut, the return to the soil would be very great; upon which he related to us the following fact illustrative of our remark.

Some years back he purchased a farm on Jones' Falls, called *Poplar Hill*, on which there was a lot of eight acres, which, from the exhausting course of culture to which it had been subjected, was almost literally deprived of its vitality. It was not convenient for him to apply either lime, ashes or stable manure, and so impoverished was the lot that the general opinion of the neighbors was, that it would not bring more than *six bushels* of wheat to the acre. This opinion was based as well on the results of former years' productions, as on the then present appearance. In this discouraging aspect of affairs, being unwilling to let it remain idle, he sowed it down in *clover*, and pushed its growth by plaster. The clover thrived tolerably well, was ploughed in the next fall, and wheat sowed on the clover lay; the produce of the eight acres, to the great astonishment of Mr. Sinclair and his neighbors, was 200 bushels of good heavy wheat, being an average of 25 bushels to the acre. This result, as we have before premised, was effected without the application of any thing in the form of manure save the clover and plaster, and to those agents alone, is this great melioration in the condition of the soil of Mr. Sinclair's lot to be ascribed; and we hold it, that it is a matter of perfect indifference whether the effect was produced by the clover acting as a manure, or the plaster as a stimulant; whether from the affinity of the latter to attract moisture, or by the combined operation of both—we say, be the *modus operandi* what it may, the effect was most salutary and wholesome, in converting a worn out field into a state of fertility. The success of this experiment, for it was but an experiment at that period, together with the thousand of other encouraging results, which have subsequently taken place, should make every one who has a poor field sow it down in this grass, whether his object be the attainment of a good crop of nutritious hay for his stock, or a luxuriant clover lay to turn in to fertilize his soil: and whether his object be the one or the other, he should not sow less than three gallons of seed, if sown alone. In our view, a great fault is most generally committed in not sowing *enough* of seed. If intended for hay, a primary object with every farmer should be, to have that hay as *clean* and *free from weeds as possible*, and the only way to effectuate that, is by filling the entire surface of the ground with grass, inasmuch as leaving unoccupied spaces in a clover field, only serves to encourage the growth of noxious weeds, exhaust the strength of the soil, render the hay foul, and ultimately to supplant the clover by unwholesome grasses and weeds. There is another mistake, which many farmers make in their great desire to practice a *wasting economy*. We allude to the time of ploughing in their clover lay. Many delay this operation until the third year, when, in the natural course of things, the clover is nearly run out, it being a biennial plant. This delay, therefore, defeats, in a great measure, the very effect intended to be secured by the ploughing in of the clover, because of the scarcity of the plant. Whereas, if it were to be turned in the second year, the decomposition both of the tap and lateral roots and stems, would exercise the happiest effects in fertilizing, separating, and rendering the soil friable.

But is it not wonderful, that notwithstanding the advantages resulting from the clover culture, in the comfort of animals, the melioration of the soil, and increase of crops, has been known and universally acknowledged in Europe for upwards of two centuries, and it is well on to fifty years, since it was first introduced into America, that it is not even now in general cultivation throughout our country? It was but the other day that the raising of small patches, by two gentlemen in one of the counties of North Carolina, was hailed as a meritorious novelty. We rejoiced sincerely when we saw the annunciation that the good work had been begun there; for in the language of an old adage, it is "better late than never," and we doubt not the intelligence of the good people of that state, will, when the benefits of the clover culture are placed before them, soon discover its great advantages, and emulate their neighbors in the praiseworthy work of rendering public good.—*Editor.*

From the Genesee Farmer.

THE CUT WORM.

Although all insect life, in the worm or maggot state, is more tenacious of existence than in any other, the cut worm deserves a high rank in the class of invincibles. In seeking for a destructive or preventive agent, a broad ring of mercurial ointment was first tried, as a boundary or barrier to their motion. This was passed with great precipitancy, and even tasted with apparent indifference. In the same manner a number were surrounded alternately with a solution of oxygen, muriate of mercury, oil of vitriol, aquafortis, japan varnish, spirits of turpentine, and spirit gas, most of which were first tasted by the worms, and then heedlessly forded. A little oil of vitriol was applied to the head of one, which he seemed to dislike when it came to his mouth, but was unharmed by its action. Nitric acid was applied in the same manner and with the same result. A number were immersed in a saturated solution of corrosive sublimate, which caused them to disgorge the green contents of their stomachs, and to writhe for a time as though in a dying state. When their motions had ceased, they were removed from the bath, and in one minute were fully resuscitated, and scudded away as fast as possible. Some fresh ones were next dropped into sulphuric acid, (oil of vitriol,) which caused also a disgorgement and writhing violently for a shorter space. On its ceasing they were removed, and lay as many insects that feign death when disturbed, or think themselves observed. From this condition they suddenly started into life, and scampered away as if nothing had happened. The conclusion was irresistible, that however vigorous transpiration might be, the imbibing power was wanting or obedient to their will. None of the alkalies were tried, but the idea was suggested that their spiraculi may be closed with an oily substance, and these would remove it and destroy them. But after the above experiments, we had little hope of finding an antidote in the apothecary shop. Like the curculio, this enemy requires mechanical and not chemical warfare for its destruction.

In despair of finding out a remedy for their ravages, the owner of a young nursery of some thousands of trees in this city, when all the budding and grafting was threatened with destruction by their seizing the tender buds when they first gave signs that the budding was successful, he was induced to carry a few to the poultry yard. The avidity with which they were devoured, left no doubt of their being a perfect dessert for fowls. Accordingly they were invited, together with all of his neighbors', to a banquet in the nursery. A few worms placed beside the stocks for a bait were first picked up, and as is their wont, more were immediately sought by scratching where the first were found. This operation succeeding to the extent of their inclinations, the whole tribe immediately became hunters of the cut worm, and very little experience pointed the proper places and necessary depth beyond which they found it useless to scratch. The number eat by each fowl it were useless to calculate, but with crops distended nearly to bursting, they were withdrawn for fear of bad consequences to themselves. No mortality to the fowls followed, and they were subsequently introduced a few times, till their scratching mania threatened the entire destruction of the nursery, which was planted but the year before. They however accomplished a great work in a short space, and have recommended their species for this useful work.

M.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

[Continued from p. 281 Vol. III.]

An account of some experiments on feeding sheep.

In the preceding chapter, we confined ourselves to the common vegetables usually employed in this country in feeding sheep, which long experience has proved to be the most advantageous; but we think the following detail of some novel experiments on their food may afford some further useful hints respecting the value of other substances, even should their employment be not immediately expedient. The first were made by M. Cretté de Palluel, and by him communicated to the Royal Society of Agriculture of Paris, in 1789, of which the substance is as follows:—he states, that the practice of feeding sheep in houses was commonly adopted in many of the provinces of France, where they were fed with clean corn. (i. e. barley and oats, sometimes gray peas, beans, and rye,) and sweet, fine hay; and that, when roots were given in lieu of corn, clover, rowen, or lucerne hay was continued. Though the sheep thus fed on roots did not become so fat as those which were corn-fed, yet they all fattened: and he thinks they would have made greater progress, if their food had been varied. This opinion he supports by an experiment made on four, whose food was changed, and the animals ate considerably more. The sheep which were put on potatoes, were for a few days somewhat averse to them, and at first ate but little; consequently they did not thrive so fast; though they recovered in the second month what they lost in the first. Those which were fed on turnips and beets, ate heartily of them from the beginning, and continued so to be. They all drank much less than those which were corn-fed. M. de Palluel thinks that corn might be advantageously added to the roots; and, when the sheep are destined for sale, if two feeds of corn be given them for a fortnight, in the intervals between their meals of roots, this would give a degree of firmness both to their flesh and tallow.*

A very valuable addition to the articles of sheep food has been made by employing muscovado sugar. Under the direction of the Board of Agriculture, a series of experiments was undertaken by the late Rev. Dr. Cartwright, in order to ascertain the daily quantity of brown muscovado sugar necessary to fatten sheep; to show its effects and value when so applied; and to demonstrate what substance sufficiently cheap might be mixed with it, so as to prevent its application to common uses, in order to protect the revenue, and yet render it not unpalatable or pernicious to animals feeding upon them. It should be stated, that these experiments originated in a suggestion of the Parliamentary Distillery Committee of 1808, that the drawback on sugar should be allowed to the farmer for agricultural purposes, on his mixing it, in the presence of an excise officer, with some substance, which would render it unfit for common uses. This suggestion was not embodied into legislative enactment; but Dr. Cartwright availed himself of a short interval of leisure, in order to ascertain how far the proportion might be practicable. The following is an abstract of his extensive detail addressed to the Board of Agriculture:—

The flock of sheep purchased for the purpose of instituting a set of experiments to ascertain the facts enumerated in the title of the paper, consisted of fifteen two-shear Down wethers, which were bought at Chichester, 24th of August, 1808; they were bred upon the Downs, had been folded through the summer, and were in a common store state. They were weighed on the 27th of August, and their average weight was $90\frac{1}{4}$ lbs.; the price was 35s. per head. For the first week they were folded every evening; each had half a pint of bran and a quarter of a pint of peas; and the same was given them when they left the fold in the morning. In a week they became habituated to dry food, and then to this quantity of bran and

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* This account is abridged from the "Mémoires de l'Academie Royale d'Agriculture," of Paris, for the year 1789. There can be no doubt that corn and pulse are the most efficient food in fattening all cattle; but the consideration for the grazier is not only what will *soonest*, but also what will *most economically* effect that object; and in that important view, it is much to be doubted whether grain can, in this country, be profitably applied to sheep.—Ed.

peas was added an ounce of sugar for each. When they were familiarized to this, the next object of Dr. Cartwright was to try what different substances might be given in addition to the sugar, which would not be injurious to them, and which they would neither reject, nor which at the same time would spoil the sugar for all other purposes; and he thought it better to try the experiment with the different substances, while the sheep had access to the grass field, rather than wait till they were kept upon artificial food altogether.

The substances used for this purpose were, linseed-oil, train-oil, palm-oil, oil of hartshorn, assafœtida, urine, antimony, and charcoal; most of them preventing the sugar from being used in distillation, and all of them spoiling it for common purposes. Linseed-oil was first tried, in the proportion of one to thirty-two parts of sugar. This mixture was given for the first time on the 7th of September, and was put into one only of the three troughs out of which they fed; the sheep, however, ate indiscriminately, and apparently with the same appetite, the mixture which contained the linseed-oil, as those which had the sugar only: on the following day the quantity of oil was doubled, and the sheep continued to feed upon it with the same appetite. After this, train-oil was given in the same proportions, and with the same success; and it was supposed, from the particular avidity with which they devoured this mess, that the train-oil, so far from rendering the sugar less palatable to them, gave it a more agreeable zest and poignancy. The next experiment was with assafœtida, in the proportion of one to four hundred and forty-eight parts of sugar: part of the sheep began upon this mixture immediately, but others hesitated, and when they did feed, it was somewhat fastidiously, and the troughs were not emptied quite so clean as before. This experiment was suspended at that time, and a trial made of a mixture of sugar with urine, in the proportion of one part sugar to twenty-four of urine; but an obstacle, from swarms of bees devouring the mixture as soon as put into the troughs, prevented the experiment from being carried on at the usual hour, and the mixture was obliged to be given to the sheep in the evening instead of the morning; they were, however, no sooner accustomed to the change of time, than they fed upon it as greedily as upon the other mixtures, and there was no reason to conclude that the urine had any influence in abating their appetites, or was in any degree offensive to them. The experiment next in succession was with palm-oil, which appeared very likely to answer the purpose of the experiment, and as far as the sheep were concerned, it fully justified the expectation; for they did not seem concious that any variation had been made in their usual repast. The experiment with assafœtida was then renewed, and the sheep fed on this as readily as on the other mixtures; it was given in the proportion of one part to two hundred of sugar. The next experiment was with the empyreumatic oil of hartshorn, a substance uncommonly offensive to the smell; but even this was not rejected by more than two or three sheep, and not by them for more than a day or two; the proportion of it was one in two hundred and twenty of sugar. Tartar emetic, in the proportion of two hundred and forty of sugar, was afterwards given, and produced no ill effect on the bowels of the animals. Dr. Cartwright being convinced, from these experiments, that of the substances recommended for the purpose unfit for common uses, and of which he had made the trial, there was none which sheep would reject when mixed with sugar, in proportions sufficient to answer the end proposed, thought it might be also satisfactory to the Board to know in what larger proportions the oils might be given before the sheep would betray symptoms of disgust. Linseed-oil, train-oil, and palm-oil, were given in the proportion of one to eight, and the allowance of sugar at the same time increased to two ounces each per day; and these mixtures appeared to be equally as palatable to the sheep, as any thing which had been administered, and produced the same results, and without occasioning any change in the state of the bowels.

On the 29th of September the sheep were again weighed, when their average weight was nearly 109 lbs. each, being an increase of upwards of one-fifth of their original weight; and they were tolerably fat, though it was the opinion of the person who purchased them, that they would not make themselves fat on grass only before Christmas.

From the 24th of September to the 22nd of October, their allowance of food was increased to a quart of bran per day, one pint of peas and three ounces of sugar,* ringing changes at the same time with the different substances with which the sugar was debased, which was done to discover the particular substance they most relished, and though they appeared to be extremely fond of all, yet, if a conjecture might be hazarded, the preference was in favor of train-oil. Dr. Cartwright, however, suggests, (if the practice of using sugar in this way should be adopted,) that instead of employing any one of these articles singly, it would not be unadvisable to use a composition of several of them together, which would be attended with no additional expense; and he recommends—instead of mixing, for example's sake, four pounds of palm-oil, with one hundred weight of sugar—that four pounds of a mixture be substituted, composed of palm-oil one pound, train-oil one pound, urine two pounds, emetic tartar two ounces, assafœtida 24 grains, and oil of hartshorn 28 drops; since in this composition are comprised an animal, a vegetable, and an empyreumatic oil, a substance containing ammoniacal and other salts, metallic calx, and a resinous gum; and the whole expense of which would not exceed one shilling and eight-pence upon each hundred weight of sugar. He is also of opinion, that the most practicable way of managing this business, would be to have only one person or company in each sea-port, where sugar is imported from the West Indies, licensed to sell it in the adulterated state.

This detail of the experiments is thought by the author to have afforded a very satisfactory conclusion, that sugar thus adulterated may be advantageously given to sheep, and indeed to other animals; for a horse was equally fond of it, and both sheep and horses are known to be delicate feeding animals compared with cattle.*

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* In the West Indies, it is a common practice to give molasses to both oxen and horses: it is mixed

On the 22nd of October, the sheep were again weighed, and were found to have gained an average increase of weight of 15 pounds each since the 29th of September; they were then taken into the house, and kept upon artificial food altogether; but one of them appearing to droop, that with two others was sent to the butcher, and the remaining twelve, reserved for further experiments, had no sugar in their food for several days, that they might be reconciled to its omission, and might all start fair, without any preference of means.

On the 2d of November these were divided into three classes of four sheep each, and were weighed on the 12th, when a very inconsiderable gain was perceived, which was accounted for from their not being yet reconciled to confinement. An attempt was now made to adulterate their food with charcoal, but this part of the experiment was soon given up, from the difficulty of obtaining it sufficiently pulverized; bran, peas, and hay, were given to all, and to the first class six ounces of sugar each per day, to the second class four ounces each, and to the third class none. They were weighed every week, and the respective weights of each are given in Dr. Cartwright's original communication, but the increase of weight was not considerable, and sometimes one class and sometimes another had the superiority. Their progress in confinement was not equal to that which was made when they were at liberty; and both those which had only four ounces of sugar per day, and those which had no sugar at all, made rather more progress than those which had a daily allowance of six ounces, and the advantage was rather in favor of those which had the four ounces.

From all the facts taken collectively, Dr. Cartwright draws the following conclusions:—

"1. That sugar may be given with great advantage to sheep, if not confined, especially if they have access to green food, however little that green food may be in quantity.

"2. That sugar may be given to them with every prospect of a beneficial effect, in the quantity of four ounces per day to each sheep.

"3. That sugar, supposing it to be purchased at four-pence per pound (which it might be if duty free,*) would at the rate of four ounces per day be paid for in a return of flesh, exclusive of the advantage of expeditious feeding, and the benefit to be derived from the manure.

"4. That six ounces per day to each sheep exceeds the maximum that can be given with the best advantage to sheep of the size of South Downs.

"5. That the advantage of stall-feeding sheep altogether upon sugar and dry food, of whatever nature that food may be, is extremely problematical."†

On these ably conducted experiments we have only to remark, that Dr. Cartwright has fully shown the practicability of *feeding* sheep, at least partly, with sugar; the *profit* however is the material point, and that can only be ascertained by comparative trials of food given with, and without sugar, to which, as the object was chiefly to discover how far the sheep would relish it, the experiments were not sufficiently in point; but it seems probable that, were the duty taken off, the farmer might beneficially avail himself of this article, and also benefit the sugar planters, without interfering in any degree with the distilleries.

Some experiments, tried on dogs, by the celebrated Dr. Magendie, have been adduced as proofs of the fallacy of the commonly received opinion that sugar, gum, oil, butter, and other similar substances which do not contain azote, are nourishing articles of food.

He fed those animals separately on sugar and water, olive-oil and water, gum and water, and butter; and they all died within thirty-six days. But these experiments cannot be considered conclusive; for it appears, from other trials, that the stomach requires substance as well as nutriment: thus, of two dogs, one fed on the jelly extracted from beef, and the other on the fibre of the same beef, from which all its nutritive matter was supposed to have been exhausted, the one fed on the jelly died, whilst the other throve. The sugar, and other substances ought, therefore, to have been combined with solids in order to arrive at the desired conclusion.

[To be Continued.]

[The two following communications were received just before the close of our last number, and after the foregoing article on the same general subject was ready for the press. We are gratified to have the confirmation here furnished to several of the points there maintained. We are also pleased to count "A Planter" among the contributors to the Farmers' Register. From his letters to the Southern Agriculturist, (republished in Vol. I. Farm. Reg.) we obtained some of the earliest information that the prairie lands furnished practical proofs of what we had maintained by argument as truths, though only known in theory, and sustained by reasoning alone. From the peculiar fitness of the lands described by our correspondent to be improved by the application of the theory of calcareous manures, we begin to hope that even the tillers of the rich western lands will cease to believe that nothing but cultivation is required for their fields. It would seem that there is no region where sure means can be so easily and cheaply used to preserve, or to create fertility—and none where the neglect of those means will be ultimately more certainly visited with well deserved loss.

For want of proper means, and practical knowledge, still more than on account of the small quantity of the specimens of soils mentioned below, we did not attempt to ascertain the proportion of vegetable matter contained—though that is a point which well deserves investigation. The three specimens contained, of pure calcareous earth, 11, 84, and 27 per cent.: for this ingredient alone, the third would be a rich and cheap manure, and the second, more than thrice as valuable for the adjacent poorer wooded lands. Whether the

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with their water, and materially assists in improving their condition.—Ed.

* Molasses, and coarse West India sugar, may now be obtained wholesale, for very little more than half the price.

† Communication to the Board of Agriculture, Vol. VI. Part II.

calcareous or the vegetable ingredient is the more desirable as manure, depends on which of the two is most deficient in the soil to be manured. The union of the two substances is essential to durable value and fertility in soil—and where both are wanting, the prairie earth, formed principally of vegetable and calcareous matter, is a better manure than any that nature or art has yet supplied.]

MANURE FROM AND ON PRAIRIE SOILS.

To the Editor of the Farmers' Register.

I sent to you about two months past, three specimens of prairie earth, taken from under the surface of the ground, and one of them as low as four feet. They are contained in joints of cane, and I fear are in two small quantities for chemical analysis. My object in sending them was to enable you to test more fully the accuracy of the facts hinted at in the communication of your correspondent E. (p. 715, Vol. II.) that the prairies contained more vegetable matter under, than in their surface. The analyses there made, countenance the idea—and the fact that some of the lime-colored prairies are much more productive after a few years cultivation without the addition of any vegetable matter, seems to do the same. But they are not satisfactory. Results in agriculture are so often the effect of other causes than those we attribute them to, that it is not safe to consider a fact so established as to make it a guide, until rendered certain by repeated experiments; and as the ascertainment of this fact would be a matter of consequence, I should be much pleased to have the benefit of your examination into it. I also sent the specimens with the desire of knowing whether the prairies were such calcareous earths, and if of such richness as to make them a valuable manure when put on other kinds of land; and whether those are best for that purpose that have the most lime, or the most vegetable matter mixed with the lime. The prairies lie on almost every plantation in such close contiguity to the sandy lands, which have in most cases a heavy coat of leaves on them, that the carting on the prairie would be attended with but little trouble. I use the term *sandy*, because the usual term here, but it does not mean *poor* lands, for they are generally oak and hickory lands, very free, and that produce fine crops for a few years, but are not durable. These lands work kindly under the plough, and if we had any means of making them last, as convenient to every body, and as easy of application as hauling on prairie earth, it would do as much in preventing a rich soil from getting poor as your *Essay on Calcareous Manures* is doing in making a poor soil get rich. The burning of the lime, and hauling it on the land, I fear might be too troublesome for general practice.

Your correspondent H. (Vol. I. p. 278,) has adduced many facts to show how beneficial to health the use of lime has been. He attributes, and apparently with much reason, the health of the city of Mobile to the covering of the streets with shells. If such effects have been produced by such a small cause, how much more certainty may be given by shelling the yards of all the crowded parts of that city? May not the city of New Orleans be very much improved in health by also shelling the streets and yards, and by the free use of lime in all such places as are usually directed by the Board of Health? The objection that the subsoil is too moist, and will not admit of stoning or paving, or any other covering that will bear the conveyance of heavy burdens on them, would be removed by making rail roads through the business parts of the city, and restricting to broad wheel carts the conveyance of heavy burdens on the other streets.

It is unquestionably true that the prairies are the healthiest lands of the state, and probably the only lands having fertility of soil sufficient to induce the establishment of farms, that will continue healthy when cleared. The first settlers put the unwooded prairie, and the thin lands least wooded, into cultivation, as easiest to clear, and the prairies were healthy. At this time the richest and most densely wooded forests are killed, and such will be the case for a few years. The immense number of decaying trees giving off the products of decomposition, would not make it a matter of surprise if such a great cause should be sufficient, for a time, to counteract, and to even counterbalance the beneficial influence of the lime. That this will be but for a few years, I am induced to think, from having observed the well established fact that new mill ponds, while the trees are rapidly decaying, make situations sickly, that were healthy before, and which in a few years become healthy again. Looking a few years in advance of this time, and I think the prairies will be valueless to those who abuse them; and for those who will use them properly, they will constitute the most valuable farms of the state, and furnish perfectly healthy residences on them.

I send you herewith a communication on the prairies, which is intended as a continuation of the subject before treated of in two numbers, and it may be added to on some other occasion.

A PLANTER.

Alabama, Aug. 4, 1835.

ON THE PRAIRIES OF ALABAMA.

To the Editor of the Farmers' Register.

I sent to the Southern Agriculturist, two years ago, two communications on the advantages and disadvantages of locating a planting interest in the prairies of this state, in which I gave, to the best of my observation, a description of the red and gray lands, the river swamps, and the prairies, with their several peculiarities, so as to enable the new settler to make his selection among them. The prairies were described as a healthy, high, dry, and undulating submarine soil, generally gray or lime colored, and unwooded on the crowns of the elevations; the woods, and with them a black soil, commencing at half their declivities, and continuing through the intervening valleys. The soil light and loose, readily absorbing water at and near its surface, and impenetrable to it at any depth below, and the water never becoming putrid. I have had the opportunity of being much better acquainted with the prairies since that time, and my subsequent experience induces me to think that the opinions then expressed, were substantially correct. This country has been at some time the bottom of the sea, I think is evidenced by the immense amount of rotten limestone which forms a stratum of many feet in thickness, with oyster shells of immense size scattered over and under the surface every where, and occasionally the petrified remains of salt water fish. I think it probable when these lands first emerged from the ocean they were unwooded, and unfit for vegetable life, but that by the influence of heat and moisture, and other agents, they gave life to some of the inferior grasses. That the annual decay of these grasses gave an accession of vegetable matter to the earth, which by repeated rains has been washed down the hills. That this increase of vegetable matter thereby, has given growth to trees, which in turn, by the great annual increase of it, from the falling of their leaves, has continued the growth, increased the fertility, and given color to the earth. Any one standing on the summit of one of these elevations, will notice trees growing wherever the slope of the ground would naturally wash the soil to, and no trees growing where it would wash from. The same is to be observed where ravines of even very gentle slope extend to any distance up the hills. He will observe also on many of the knobs of the hills there are small levels in which the lime, in a pure state, shows itself in lumps, protruding out of the earth, and there trees are generally growing, because being level, the first grasses did not wash off.

That the coloring of the earth is given by the quantity and the quality of the vegetable matter in it, I infer from observing that in every place where a single tree has grown on the bald prairie, that that spot is always of a different and a darker color than the surrounding soil, and yet never as dark as in the dense forest. That trees generally dye a black color, for such is the general color of the prairies. Where you see decided shades in the color of the soil, you will see a reason for it in the kind of trees growing on it. There is a large class of lands called the "post oak prairies," where the soil is rich and very light colored, and the fact is, the post oak bark makes a light colored dye.

The theory that the prairies were kept free from trees by the annual Indian fires, is unsatisfactory, as that cause would be uniform in its effects in all prairies, and all other lands, and so soon as the cause should cease, as it has done here for many years, we should see bushes springing up indiscriminately every where, which is not the fact. The growth of bushes is every year diminishing the extent of the bald prairies; but they are uniform in their encroachments, and only on these parts where, from the position of the ground, they have the opportunity of receiving a greater deposite of vegetable matter. This however, is a matter of theoretical speculation, which may be left to others more conversant with the subject, and better able to decide correctly. I shall proceed to what is of more consequence to the practical planter.

The prairies are calcareous soils, and possess the quality of chemical combination with all putrescent animal and vegetable matter, so that none is lost. If this be a fact, almost every prairie planter has within his farm, the means, in ample abundance, of keeping his lands rich, and of resting such as have been worn, and with infinitely less labor in its application than any other class of planters in the United States. For evidence that they are calcareous soils, and possess the quality of chemical combination attributed to them, I refer to the *Essay on Calcareous Manures*. As a planter, I thank the author for the valuable information contained in that essay. It should be in the hands of every prairie planter, as it points to more means of improving his land than all else that has been written on the subject. The fact, however, must have come under every one's observation, who considers what becomes of the very large mass of leaves that are every autumn scattered on the ground, and are not to be seen in the spring. They are stuck to the earth by the winter's rains, and are used up by the lime; that is, the products of their decay are not evaporated, but are held in combination, no part is lost, and it all becomes manure; and it is to this that we are indebted for our very fine soils. Such being the fact then, it would seem reasonable that the planter should use the most practicable means of placing within the reach of that combination, all the vegetable matter he can. And first in the class of means, is to convert to his use the many tons of leaves annually deposited on the sandy woodlands he designs to clear. On them he should wagon and spread 10, 15, or more loads of the prairie earth, and scatter over the surface, and they would not be evaporated and lost under this powerful sun, but would be combined in a great measure with the lime, and then fixed as manure. The nearness of the prairies to such lands on most plantations, would make this an easy task. A wagon and cart ought to manure ten or twelve acres a week. Lime for this purpose is much used in England, and in the northern states, and in quantities sometimes as great as several hundred bushels to the acre, where the cost of the material and its conveyance are both great. The hauling of leaves from the woods, and scattering them in the alleys of the cotton and corn rows to be listed in, and to be within the bed of the ensuing year, would also be attended with inconsiderable trouble. The greatest trouble will be to make up the mind to do it, and to commence it.

The most important use of the fact will be to induce the planter to *list* his lands. This is done in two ways; the best, though the most tedious, is to run a furrow in the centre of the alleys of the last year, and to pull up the cotton and corn stalks and lay them in with the buts or root ends all in one direction, trampling them with the feet, so as to break the large limbs, and with the hoe draw from the old beds the grass, weeds, and surface soil on them, and with two cuts of a mould-board or shovel plough to lap the earth on them. The plough should commence the covering at the root end, as the stalks are less displaced by it, and though many of the limbs will show out of the covering, it will be of no consequence. This should be done as early in the winter as your cotton is gathered. A much more expeditious mode of listing, is to do the same thing, except not to use the hoe at all; and this is done with less than half the labor expended in pulling up the stalks, collecting them into heaps, and burning them. You give by this tedious labor, this consuming, wasteful, and unplanter-like practice, a mass of materials to the air, worth more as a manure, than all your cotton seed. Only see how many large piles an acre of fine cotton stalks would make, and then calculate how much you throw away that would be converted into a valuable manure by chemical combination, without the labor of carting from and to the field.

The limits of my paper will not permit me to say on this subject as much as I think its importance deserves, and I must therefore make its continuance the subject of another letter to you.

A PLANTER.

Alabama, Aug. 4, 1835.

ON THE CAUSES OF DISEASE IN HOGS.

To the Editor of the Farmers' Register.

In the first No. of Vol. II. I find from the *Genesee Farmer*, a few remarks on the diseases of hogs, with a request for information on a particular case stated.

The hogs alluded to were kept in a large frame pen, with a plank floor, and fed on "bran, shorts, and short midlings." Three hundred had been penned, and fifty died during the winter. A neighbor gave a drove seven hundred dollars worth of corn, and the same disease made a similar havoc. On opening them a great many slim worms were discovered, about one inch long, in the leaf, and about the back bone.

On the same page, one of your correspondents states his hogs being subject to lice, &c., and requests a remedy. I believe it is pretty well settled that no animal in its natural state, is less the subject of disease than the hog. But as soon as we get him fairly under our jurisdiction, he becomes liable to many—and it is not a little astonishing, on cool reflection, that we frequently begin the management, and actually the improvement of the whole animal world, by a vigorous attempt to counteract the laws of nature; and one of the first and most certain consequences of our course is, to generate disease as foreign to the animal as our course of management and improvement is to those laws which nature wisely and kindly coupled with a strong, instinctive capacity. Amongst the last we find distinctly marked, a disposition to find and use a great variety of food. Our knowledge of the substances used by the animal world in this way, and hunted for by them with much anxiety at times, teaches us that in their operation they are medicinal, and that the cravings of animal nature must call for them, more to counteract and cure a predisposition to disease, or disease itself, than for yielding nutrition. Would not common sense dictate, on reflection, that in our management of any animal the same rule ought to be observed, if we wish to produce the animal perfect, and to preserve animal health?

Among animals which we appropriate to our use, as food, there cannot be found one which affords a more singular instance how wonderfully nature yields to our extravagant deviation from its laws, than the hog. The animal that roams over the surface of the earth, and eats of almost every vegetable and animal substance within its reach, is put into a small pen, deprived of locomotion, and restricted to dry corn, and water. If we admit that a part of that which they hunt for, and consume, if not in duresse, is in its operation necessary for the preservation of animal health, ought we to be astonished at the appearance of disease in our *hog in limbo?* I think not—but rather, that disease is not uniformly the issue—and in fact, I fear, that we frequently mistake a mass of obesity in disease, for sound pure pork. The notorious different operations on the stomach, of wild animal oils, generated in nature's mode, and those produced by artificial means, is stubbornly in point. No animal comes nearer the hog than the bear. You may drink the oil of the last, without the slightest danger of producing any aversion of the stomach.

Were you to make a pen capable of containing any given number of hogs, placing in one end, an apartment, with not only a plank floor, but elegantly planed and jointed, and covered—and in the other a shed, covering a floor of dry earth, with a sufficient bed of dry leaves, and take a hog from all the different species on the globe, I think without hazarding, we might quickly determine which end they would prefer. Among all the different beds for rest constructed by this animal, I feel assured they were never known to drag together a number of *planks*. This preparation for their rest, is not at all consonant with their notorious, natural disposition. But in the bed of dry leaves they delight. Nor are they averse to having that bed on a clean place of dry earth—especially if protected by a shelter. Had the gentleman before mentioned, have thrown into the pen a quantity of rotten wood, and a portion of charcoal, or occasionally boiled the corn in strong ley, or added a portion of copperas and brimstone, the issue, I am assured, would have been extremely different. As for lice, the brimstone would have put that out of the question.

The disease of those hogs is not unknown in this section of the Union. Carelessness and artificial food, destroy many with it, but intelligent hog raisers and fatteners avoid it, by the means of simple preventives.

Some years ago I found myself annually losing hogs, with what they told me was the *worm*—sometimes in the stomach, then in the kidney, and lastly, when fattening in the back bone. I gave my hogs dry corn, in a close pen, profusely. I heard of an old Roanoke Virginian, who had emigrated to this state, who, it was stated, had acquired uncommon practical knowledge of the most successful mode of raising and fattening this animal—and wishing to raise them in perfection, I went to see the old gentleman, who had been at it for forty odd years. The result of an evening's conversation enabled me to drive the worm in every shape and place, and save hundreds—and raise the animal with actually half the common expense, giving them a good growth—and as it may be new, and perhaps useful to many of the readers of the Register, I will transmit the detail shortly.

AGRICOLA.

Alabama, July 20th, 1835.

ON RAISING AND FATTENING HOGS.

To the Editor of the Farmer's Register.

I promised to give you a detail of my mode of raising and fattening the hog, as communicated to me by an old Virginian, and a little improved, I believe, by my own experience and practice. My rotation of crops, and the circumstances that grow out of it, permit me to live up to an article in my agricultural creed, to wit: that five hogs *in-*

side of a good fence, are worth more to me, ultimately, than ten *outside*—or, in plain English, "raised in the woods." But I will here remark, that for a hundred "good reasons me thereunto moving," I always include in every field, if possible, water and woodland, especially if marshy, or the heads of branches. With the raising and fattening of hogs, I combine, as far as possible, the fabrication of manure. For my stock hogs, I have a standing pen adjoining my dungstead, for the purpose of occasionally mixing their manure with that of the cattle, horses, mules, &c. This pen is littered with leaves, or pine straw, regularly—and as regularly emptied. Through one end, a long shed, sufficient for the standing stock, shelters them when they choose to avail themselves of it. That part not covered is densely shaded with trees that were topped for the purpose. The whole is what every person of common means and capacity may have. For my breeding sows, I take care to have a good rye pasture, after they produce pigs—or a rich crab grass one—and for all a plum orchard, peach orchard—and for winter range, a field of the black and red tory pea, for about two hours in the day. This, with ripe cucumbers, melon rinds, simblins, pumpkins, cabbage leaves, and turnips of different kinds, &c. secures them plenty. For the purpose of securing the progress of the manure heap, all that can conveniently, and with economy of time, be thrown to them is so given. A part of every day they are permitted, unless in very wet, or severe weather, to run into the field, and adjoining woodland, and which latter, I conceive, contains what nature may require in that animal, for the preservation of its health—aiding in the formation of manure, as well as health of the animal. Rotten wood is occasionally thrown into the pen, with the remains of coal-kilns, or tar-kilns, &c. The time they are out of the pen, does not embrace more than one-third of the day. Every second day in the evening, or rather near night, I give to every four head, one ear of corn, shelled into water in the morning, and every fourth day, just before giving, drained off, and rolled in fine salt, suffering as much to adhere to it as will adhere. Every Monday, I add a sprinkling of powdered copperas, and every second Monday, a little brimstone. The corn I give in narrow troughs, laying it down in handfuls, or mixing it carefully in the trough, in the bottom of which, every Monday, is placed some dry hickory, or black-jack ashes. At one year old, each hog averages one bushel of corn. At two years my hogs average 200 lbs. of pork each. Whenever time and circumstances will possibly admit, I cut rye and oats, and gather the peaches and apples, and throw into their pen—detaining the hogs in it as long as possible. During those days, they get about one hour out to go to water.

In the fattening, I pursue the same rule precisely, varying only in the time they are allowed to roam abroad, not exceeding one hour in the middle of the day. All the vegetable diet they get, such as pumpkins, ruta baga, sweet potatoes, &c. is steamed, and mashed up with corn meal. Fermented drink that has just reached the acetous fermentation, is given three times per day, in a clean trough. For lazy hogs, the salting, by doubling the quantity, is a perfect cure. The excitement it produces in the stomach for green food and water, drives them to the woods, and the appetite it keeps us, keeps them going. My hogs have uniform health. I have not lost one by any other disease than the knife, for years. They fatten kindly, and my meat has been pronounced by Virginians to be fine. I believe that the real fattening disposition of the animal is only kept up by the best state of animal health. There is a fattening disposition. The production of disease and obesity, is the result generally of gorging with improper food, or rather food not altogether calculated to produce sound animal flesh.

Pursuing the foregoing, I will insure freedom from worms, in every part, and in every stage of the life of the hog, and also a fine quantity of superior manure, with sound animal flesh for diet.

AGRICOLA.

Alabama, July 29th, 1835.

ON THE USE OF LIME AS A MANURE.

By M. Puvis.

Translated for the Farmers' Register from the *Annales de l'Agriculture Francaise*, of 1835.

[The publication of the following communication to the *Annales de l'Agriculture Francaise*, was commenced in the February No. of that journal, (which was received here in May,) and the June No. contains the end of the first part, "*On Liming*," and enables us to offer the translation of that portion to our readers. Only a few pages of the next portion of the series, "*On marling*," has yet appeared, and not enough to permit a judgement to be formed of its worth.

Though there are many deficiencies in this treatise on liming—and also opinions as to the theory of the action of lime, in which we cannot coincide—still, on the whole, we consider it as presenting far more correct views, and more satisfactory information, both on theory and practice, than any other work on liming that we have before seen. In other points, and those of most importance, the facts here presented, (and now first learned from any European authority,) strongly sustain the views maintained in the *Essay on Calcareous Manures*. It would be both unnecessary and obtrusive to remind the reader of these points of difference, and of agreement, whenever passages exhibiting either may occur. They will therefore generally be submitted in the author's words, without comment. A few exceptions only to this rule will be made, in cases which appear particularly to call for them.

We have no information whatever of M. Puvis, the author of this treatise, previous to the appearance of the commencement of the publication in the *Annales*. But he is evidently well informed on his subject, and is stated by the introductory remarks of the French editor, to be entitled to all respect, for his long experience, and his practical, as well as scientific investigation of the subject. If then there remains no ground to distrust his judgement or his facts, the statements made are most important to a very large portion of this country, which has heretofore been generally supposed to be deprived of all possible benefit from the use of calcareous manures, on account of their remoteness and high price of carriage. M. Puvis states that the most successful and profitable liming in Europe (for the expense incurred) is in repeated applications of very small dressings—making less on the average, than four bushels of lime to the acre, annually. This small amount, *if really as efficacious as is alleged*, would cost so little in labor and money, that the limits of the region capable of being limed may be very far extended. It would not matter though the applications should require to be repeated forever, provided the annual returns gave good profit upon the annual expenses; and far greater will be the profit, if (as we think) the soil ultimately will no longer require such repetitions—or only at very distant intervals of time—and still be a highly productive, because it has been made a calcareous and fertile soil. ED. FARM. REG]

On the different modes of improving the soil.

To improve the soil is to modify its composition in such manner as to render it more fertile.

This definition, which might be extended to manures charged with vegetable mould [*humus*] or animal substances, which also modify the composition of the soil, is limited by French agriculture to substances which act upon the soil, or upon plants, without containing any notable proportion of animal or vegetable matter.

It is said that manures, [putrescent or enriching,] serve for the nutriment of plants. But it is the same as to substances improving to the soil, which furnish to it matters which it needs to be fruitful, and which furnish to vegetables, the earths and saline compounds which enter as essential elements in their composition, their texture, and their products. Such improving substances ought well to be regarded as nutritive.*

Thus lime, marl, and all the calcareous compounds employed in agricultrue, since they furnish lime and its compounds, which sometimes form half of the fixed principles of vegetables, ought also to be considered as aliments; or, what comes to the same, as furnishing a part of the substance of vegetables. Thus again, wood-ashes, pounded bones, burnt bones, which furnish to vegetation the calcareous and saline phosphates which compose a sixth of the fixed principles of the stalks, and three-fourths of their seeds, ought well to be considered, and surely are, nutritive.

What then particularly marks the distinction between manures which improve the soil [*amendemens*,] and alimentary manures, [*engrais*,] is, that the former furnish, for the greater part, the fixed principles of vegetables, the earths, and salts, which are not met with ready formed, neither in the soil nor in the atmosphere: while alimentary manures furnish a small part of the volatile principles which are abundantly diffused throughout the atmosphere, whence vegetables draw them, by means of suitable organs: and what is most remarkable, is, that the vegetable, by receiving the fixed principles of which it has need, acquires, as we shall see, a greater energy to gather for its sustenance the volatile principles which the atmosphere contains.

The greater part then of soils, to be carried to the highest rate of productiveness, require manures to improve their constitution. Alimentary manures give much vigor to the leafy products—but they multiply weeds, both by favoring their growth and conveying their seeds—and they often cause crops [of small grain] to be lodged, when they are heavy. Manures which improve the soil, more particularly aid the formation of the seeds, give more solidity to the stalks, and prevent the falling of the plants. But it is in the simultaneous employment of these two means of fertilization by which we give to the soil all the active power of which it is susceptible. They are necessary to each other, doubling their action reciprocally: and whenever they are employed together, fertility goes on without ceasing—increasing instead of diminishing.

The greater part of improving substances are calcareous compounds. Their effect is decided upon all soils which do not contain lime, and we shall see that three-fourths, perhaps, of the lands of France are in that state. The soils not calcareous, whatever may be their culture, and whatever may be the quantity of manure lavished on them, are not suitable for all products—are often cold and moist, and are covered with weeds. Calcareous manures, by giving the lime which is wanting in such soils, complete their advantages, render the tillage more easy, destroy the weeds, and fit the soil for all products.

The improving substances have been called *stimulants*; they have been thus designated because it was believed that their effect consisted only in stimulating the soil and the plants. This designation is faulty, because it would place these substances in a false point of view. It would make it seem that they brought nothing to the soil, nor to plants—and yet their principal effect is to give to both principles which are wanting. Thus the main effect of calcareous manures proceeds from their giving, on the one hand, to the soil the calcareous principle which it does not contain, and which is necessary to be able to develope its full action on the atmosphere—and on the other hand, to vegetables, the quantity which they require of this principle, for their frame-work and their intimate constitution. It would then be a better definition than that above, to say that to *improve* the soil is to give to it the principles which it requires, and does not contain.

Importance of manures which improve the constitution of soils.

The question of improving manures is of great interest to agriculture. This means of meliorating the soil is too little known, and above all, too little practiced in a great part of France—and yet it is a condition absolutely necessary to the agri-

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*The two classes of manures which are described generally above, are conveniently designated in French each by a single word. "*Engrais*," which we can only translate as *manure*, is limited in signification to such substances as directly enrich soils, and feed growing plants—and "*amendemens*," signifying substances which alter and improve the constitution, texture, and indirectly, the fertility of soil, but the operation of which is not to furnish food to plants. In speaking of the *action* of these different classes, the sense may be rendered, though not very precisely, by the words "enrich," and "improve"—but there is no one English term that will convey the meaning of either class of substances. "Alimentary manures" will be used for the first class, and "manures improving the constitution of soil," or some similar awkward, but descriptive phrase, can only render the meaning of the word "amendemens"—useless "improvers" could be tolerated as a substitute, for convenience. TR.

cultural prosperity of a country. In the neighborhood of great cities, alimentary manures being furnished on good terms, may well vivify the soil: but animal manures cannot suffice but in a few situations, and of small extent—and in every country where tillage is highly prosperous, improving manures are in use. The Department of the North (of France,) Belgium, and England, owe to them, in a great measure, their prosperity. The Department of the North, (which is, of all Europe, the country where agriculture is best practiced, and the most productive,) spends every year, upon two-thirds of its soil, a million of francs in lime, marl, ashes of peat and of dead coal [*houille;**] and it is principally to these agents, and not to the quality of the soil, that the superiority of its production is owing. The best of its soil makes part of the same basin, is of the same formation, and same quality, as a great part of Artois and Picardy, of which the products are scarcely equal to half the rate of the North. Neither is it the quantity of meadow land which causes its superiority; *that* makes but the fifth part of its extent, and Lille, the best *Arrondissement*, has scarcely a twentieth of its surface in meadow, while Avesne, the worst of all, has one-third. Nor can any great additional value be attributed to the artificial meadows, since they are not met with except in the twenty-sixth part of the whole space. Neither can this honor be due to the suppression of naked fallows, since in this country of pattern husbandry, they yet take up one-sixth of the ploughed land, every year. Finally, the Flemings have but one head of large cattle for every two hectares† of land, a proportion exceeded in a great part of France. Their great products then are due to their excellent economy and use of manures, to the assiduous labor of the farmers, to courses of crops well arranged, but above all, we think, to the improvers of soil, which they join to their alimentary manures. Two-thirds of their land receive these regularly: and it is to the reciprocal reaction of these two agents of melioration, that appears to be due the uninterrupted succession of fecundity, which astonishes all those who are not accustomed continually to see the products of this region.

At this moment, upon all points in France, agriculture, after the example of the other arts of industry, is bringing forth improvements; in all parts especially, cultivators are trying, or wishing to try, lime, marl, ashes, animal black. It is this particular point in progress, above all, for which light is wanting; and this opinion has induced the preparation of this publication. Since more than 30 years, the author has devoted himself, from inclination, to agriculture; but he has been especially attentive to calcareous manures. He has studied in the practice of much extent of country, in his own particularly, in personal experiments, and in what has been written on them both by foreigners and countrymen. An *Essay on Marl*‡ has been the first fruit of his labors; an *Essay on the use of lime* will soon be ready: it is with these materials that he now sets himself to work. To prepare for this object, a series of articles, of the nature of a recapitulation rather than of a regular work, it was necessary to be concise, and yet not to omit any thing essential. It is proper then that he should limit himself to the prominent parts of his subject, those especially useful to practice. His advice will then be as often empirical as regular, and his directions will be precise, although supported by few developements.

An extract from this work has appeared in the *Encyclopédie Agricole:* here it will again appear, but by separate articles, which will be corrected by a systematic general view of theory, founded on practice. This is the moment for multiplying publications on this subject, because that in almost all parts of France, it is the point in agriculture most controverted—that which induces the most labor and the greatest expenditures—which presents most doubts—and which has consequently most need of being made clear.

We shall not enlarge here upon the manner in which improving manures act: we will put off this important question, with its developements to the article on lime. Here we only present the theory. Hereafter, that which we will hazard will be founded upon facts, and yet we will not promise these developements, but for the purpose of enlightening and directing practice.

Of the various kinds of improving manures.

The first in order, and the most important, are the calcareous manures. We comprehend under this name, lime, marl, old plastering mortar, and other rubbish of demolished buildings, beds of fossil shells, [*falun.*]* or shelly substances, plaster or gypsum: experience and reason will prove that we ought to arrange in the same class, and by side of the others, wood ashes, ground bones, and burnt bones. We will not place in the same list the ashes of peat, of dead coal, and red pyritous ashes: their effect is not owing to their lime, but (as will be seen afterwards,) rather to the effect of fire upon the earthy parts, and particularly upon the argil which they contain.

We will next in order treat of manures of the sea, of saline manure of different kinds, of mixtures of earths, of calcined clay: and finally, of paring and burning the turf, and the different questions which peat presents in agriculture.

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*Statistique du département du Nord.

†The hectare is very nearly equal to two and a half English (or American) acres. See account of French Weights and Measures, p. 506, Vol. II. Farm. Reg.—Tr.

‡*Essai sur la marne*, published 1826, at Paris. This is the first notice which we have had of the existence of this work, and have forthwith sent for a copy, as well as for one of the author's forthcoming *Essay on the use of lime*, that no source of information on this important subject may be excluded. But it may be inferred (from the author's expressions,) that these more extended works will contain nothing more of what is essential, than is presented in this condensed form, prepared by himself for the *Annales*. Ed. Far. Reg.

*"*Falun*—Beds formed by shells. There is one of these immense beds in Touraine. The cultivators of that country use this shelly earth to improve their fields." This definition is from Rozier's *Cours Complet*, and though it clearly shows that the substance in question is the same as what is called "marl" in Virginia, it is equally clear that neither of these authors consider *falun* as being *marl*. Tr.

Of liming—on the use of lime for the improvement of soil.

1. Among the immense variety of substances, and of combinations which compose the upper layers of the globe, the earthy substances, silex, alumine, and lime, form almost exclusively the surface soil: the greater portion of other substances being unfit to aid vegetation, they ought to be very rare upon a surface where the supreme author willed to call forth and to preserve the millions of species of beings of all nature, which were to live on its products.

It was also a great benefit to man, whose intelligence was to be exercised upon the surface of the soil, to have so few in number the substances proper to support vegetation. The art of agriculture, already so complex, which receives from so many circumstances such diverse modifications, if there had been added new elements much more complicated, would have been above the reach of human intelligence.

2. But among these substances, the two first, silex and alumine, form almost exclusively three-fourths of soils; the third, the carbonate of lime, is found more or less mixed in the other fourth: all soils in which the latter earth is found, have similar characters, producing certain families of vegetables which cannot succeed in those in which it is not contained.

The calcareous element seems to be in the soil a means and a principle of friability. Soils which contain calcareous earth in suitable proportions, suffer but little from moisture, and let pass easily, to the lower beds, the superabundant water, and consequently drain themselves with facility. Grain and leguminous crops, the oleaginous plants, and the greater part of the vegetables of commerce, succeed well on these soils.

It is among these soils that almost all good lands are found. Nevertheless, the abundance of the calcareous principle is more often injurious than useful. Thus it is among soils composed principally of carbonate of lime that we meet with the most arid and barren, as Lousy Champagne, part of Yonne, and some parts of Berry.

3. The analysis of the best soils has shown that they rarely contain beyond 10 per cent. of carbonate of lime; and those of the highest grade of quality seem to contain but from 3 to 5 per cent. Thus the analyses of Messrs. Berthier and Drapiez, show 3 per cent. of it in the celebrated soil of the environs of Lille.

4. But all these properties, all these advantages, all these products, calcareous manures bear with them to the soils which do not contain the calcareous principle. It is sufficient to spread them in very small proportions: a quantity of lime which does not exceed the thousandth part of the tilled surface layer of soil, a like proportion of drawn ashes, or a two-hundredth part (or even less) of marl, are sufficient to modify the nature, change the products, and increase by one-half the crops of a soil destitute of the calcareous principle. This principle then is necessary to be furnished to those soils which do not contain it; it is then a kind of condiment disposed by nature to meliorate poor soils, and to give to them fertility.

Ancient date of the use of lime.

5. Lime, as it appears, has long ago been used in many countries. However, nothing proves that its effect was well known to the Greeks and Romans, the then civilized portion of mankind. Their old agricultural writers do not speak of the use of lime on cultivated lands, nor on meadows. Pliny, the naturalist, tells us however, that it was in use for vines, for olives, and for cherry trees, the fruit of which it made more forward: and he speaks of its being used on the soil generally in two provinces of Gaul, those of the Pictones and Ædui,* whose fields lime rendered more fruitful. The agriculture of the barbarians was then, in this particular, more advanced than that of the Romans. After that, all trace of the use of lime in agriculture, is lost for a long time—whether that it had ceased to be used, or only that the notice of it was omitted by writers on agriculture. The trace is again recovered with Bernard Pallissy, who recommends the use of it in compost in moist lands, and speaks of his use of it in the Ardennes. Nearly a century later, Olivier de Serres,† advises its employment in the same manner, and reports that they made use of it in the provinces of Gueldres and Juliers [in Belgium.] He makes no mention of its use in France: but as the practices of agriculture were not then much brought together, and were but little known, it may be believed that at that time, Flanders, Belgium, and Normandy, made use of lime.

In England, liming seems to have been in use earlier and more generally than in France. But then, and in all time since, good agricultural practices have remained in the particular countries where they were established, without being spread abroad. Now, novelties carry no alarm with them—and in the last twenty years, liming has made more progress than in the two preceding centuries.

Of soils suitable for liming.

6. Lime, as has been said before, suits the soils which do not contain it already. To distinguish these soils from others, chemical analysis is, without doubt, the surest means; but it offers often too many difficulties, and lime may be met with in a soil in proportion great enough to exert its power on vegetation, without producing effervescence with acids.‡ But visible characters may furnish indications almost certain. The soils where the cow wheat [*melampyre*,] rest-harrow, [*l'ononis, ou arrete-bœuf*,] thistles, colt's foot, [*tussilage*], and red poppy, spring spontaneously—which produce well in wheat, legumes, (or plants of the pea kind,) and especially sainfoin—where the chestnut succeeds badly—which shows but little of dogstooth, [*chiendent*,] volunteer grasses, or common weeds, [*graminees adventices*,] except of the small leguminous kinds—soils which after being dry, crumble with the first rain—all these are almost certainly calcareous, have no need of lime, nor its

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* *Ædui et Pictones calce uberrimos fecere agros.*

†Who wrote on agriculture in the reign of Henry IV. of France. Tr.

‡This is a full though indirect admission of the truth of the doctrine of *neutral soils*, maintained in the Essay on Calcareous Manures. Tr.

compounds,* and would feel from their use, rather ill than good effects.

On the contrary, all soils composed of the moulderings [*debris*] of granite or schistus, almost all sandy soils, those which are moist and cold of the immense argilo-silicious table lands [*plateaux argilo-silicieux*] which separate the basins of great rivers†—the ground where the fern, the little rush [*petit ajonc*] the heath, *les petits carex blancs*, the whitish moss spring spontaneously—almost all the soils infested with *avoine à chapelets*, with dogs-tooth, with bent grass [*agrostis*,] red sorrel, and the little feverfew—that soil where, unless so clayey as to offer great difficulty to cultivation, only rye, potatoes, and buckwheat, can be made, and where sainfoin and the greater part of the crops of commerce cannot succeed—where, however, trees of all kinds, and especially the resinous kinds, the wood-pine, the sea pine, the larch, the northern pine, and the chestnut, thrive better than in the best land—all these soils are without the calcareous principle, and all the improving manures in which it is found, would give to these the qualities of, and nourish the growths peculiar to calcareous soils.

But there, more than elsewhere, it is especially necessary to avoid too much haste. Liming upon a great scale, ought not to be done, until after having succeeded in small experiments on many different parts of the ground designed to be improved.

Extent of surface to which lime is suitable.

7. A great proportion of the soil of France does not contain the calcareous principle. The country of primitive formation—the mountains of which the rock is not calcareous—many soils even, of which the subsoils enclose calcareous formations—the great and last alluvion which has covered the surface, and which still composes it wherever the return waters have not carried it off with them—also extensive surfaces, in the composition of which the calcareous principle had not entered but in small proportions, and which small amount has been used by the successions of vegetation—all these kinds of soil, which compose at least three-fourths of the surface of France, to be fertilized, demand calcareous manures. If it is admitted that one-third of all this space has already received aid from lime, marl, ashes of wood, or of peat, of bones burnt, or pounded, there will still remain the half of France to be improved by such means: an immense task, doubtless—but of which the results will be still more prodigious, since it will cause the products of all this great space to be increased by one-half, or more.

Of the various modes of applying lime to the soil.

8. Three principal procedures are in usage for applying lime. The first is the most simple, and is the most general wherever lime is obtained cheaply, and where culture is but little advanced in perfection, and hand labor is dear. This consists in putting the lime [the burned limestone] immediately on the ground in little heaps at 20 feet average distance, and each heap containing, according to the rate of liming, between a cubic foot of the stone, to half that quantity. When the lime has been slaked by exposure to the air, and has fallen into powder, it is spread over the surface, so as to be equally divided.

9. The second mode differs from the first in this respect: the heaps of stone are covered with a coat of earth, about six inches thick, according to the size of the heap, and which is equal to five or six times the bulk of the lime. When the lime begins to swell, in slaking, the cracks and openings in the heap are filled with earth: and when the lime is reduced to powder, each heap is worked over, so as to mix thoroughly the lime and the earth. If nothing hurries the labor, this last operation is repeated at the end of 15 days—and then after waiting two weeks more, the mixture is spread over the soil.

10. The third process, which is adopted where culture is more perfect, where lime is dear, and which combines all the advantages of liming without offering any of their inconveniences, consists in making compost heaps of lime and earth, or mould. For that, there is first made a bed of earth, mould, or turf, of a foot, or thereabout, in thickness. The clods are chopped down, and then is spread over a layer of unslaked lime of a hectolitre* for the 20 cubic feet, or a ton to the 45 cubic feet of earth. Upon this lime, there

*Though both the truth and the usefulness of this passage, in general, are admitted, yet it is incorrect in the position that none of the "compounds of lime" would be advantageously employed on calcareous soils. On the contrary, the sulphate of lime (gypsum) the most important compound as a manure, next to the carbonate, is most effective where the land has lime in some other form: and indeed (as has been maintained elsewhere) it seems generally inert and useless on soils very deficient in lime.—*Essay on Calcareous Manures, pp.* 50, 92.

†The character of the lands called by the author "*plateaux argilo-silicieux*," and which he refers to frequently in the course of his essay, can only be gathered from the context. They are poor, intractable under tillage, and but little pervious to water. The name indicates their composition to be silicious and aluminous earth almost entirely. It may be inferred that such lands resemble in soil the elevated level *ridges* which in lower Virginia separate different water courses, and especially those which in addition to being miserably poor, are remarkably close, stiff, and "water-holding"—and are in some places called "cold livery land," "pipe-clay," or "cray-fish" soils. Soil of this kind, and of the most marked character, is particularly described at page 40, Essay on Calcareous Manures, 2nd ed. M. Puvis elsewhere speaks of this "argilo-silicieux" soil as being found every where in France, and as known in different places under the various names of "terrain blanc," "blanche terre," in the south, "boulbenne," in the north, of "terre clytre," and "terre a bois"—and in the basin of the Loire, "terre de Sologne." The last name would direct us to the lands of Sologne, which furnish it, as it may be presumed, as being of like quality. Arthur Young says "Sologne is one of the poorest and most unimproved provinces of the kingdom, and one of the most singular countries I have seen. It is flat, consisting of a poor sand or gravel, every where on a clay or marl bottom, retentive of water to such a degree that every ditch and hole was full of it." Tr.

*The hectolitre contains 6102.8 English cubic inches, or is equal to 2.83, (or about 2.6-7) Winchester bushels. Therefore the hectolitre is rather more in proportion to the hectare, than our bushel is to the acre. The decalitre (named next page) is the tenth of a hectolitre, and of course the "double decalitre," is the fifth. Tr.

is placed another layer of earth, equal in thickness to the first, then a second layer of lime; and and then the heap is finished by a third layer of earth. If the earth is moist, and the lime recently burned, 8 or 10 days will suffice to slake it completely. Then the heap is cut down and well mixed—and this operation is repeated afterwards before using the manure, which is delayed as long as possible, because the power of the effect on the soil is increased with the age of the compost—and especially if it has been made with the earth containing much vegetable mould. This method is the one most used in Belgium and Flanders: it is becoming almost the exclusive practice in Normandy: it is the only practice, and followed with the greatest success, in La Sarthe. Lime in compost is never injurious to the soil. It carries with it the surplus of alimentary manure which the surplus of product demands for its sustenance. Light soils, sandy or gravelly, are not tired by repetitions of this compost. No country, nor author, charges lime, used in this state, with having been injurious to the soil. In short, this means seems to us the most sure, the most useful, and the least expensive mode of applying lime as manure.

11. The reduction of burnt lime to powder by means of a momentary immersion in water, in handle-baskets, serves much to hasten the slaking, whether the lime is to be applied immediately to the soil, or in compost heaps—some hours in this manner sufficing, in place of waiting two weeks. However, the effect of lime, in this state, may well be different, as we have then the hydrate of lime, and less of the carbonate of caustic lime.* If great rains follow, this process is not without inconveniences, because then the lime, which is already saturated with water, is more easily put in the state of mortar, which ought to be avoided more than every other injury to the manure.

The reduction of burnt limestone to powder, whether it be spontaneous, or by immersion, produces in the compost a bulk greater by one-half or more, than that of the stone—10 cubic feet, producing 15—or a ton, 10 cubic feet. This increase is not uniform with all kinds of lime; it is more strong with rich [*grasses,*] waters, and weaker with the poor [*eaux maigres.*†]

Liming as practiced in different countries.
In the Department of Ain.

12. The applications of lime in Ain date from fifty years back. At the present time, the soil which has been limed is still more productive than the neighboring, not limed. Nevertheless, liming is but beginning to extend, while marling, which was begun fifteen years later, has already covered many thousands of hectares. This is because marling is an operation within the means of poor cultivators, being accomplished by labor alone; while liming requires considerable advances, especially in this country where lime is dear, and the dose given is heavy.

The dressings vary in quantity, from 60 to 100 hectolitres the hectare, according to the nature of the ground, and often according to the caprice of the cultivators. Although these limings have not been made with all the care and economy that was desirable, they have been very efficacious, when the soil has been sufficiently drained. The following tables, extracted from the registers of three contiguous domains, belonging to M. Armand, three years before, and nine years during the progress of liming, give us the means of appreciating the results. The quantities of seed and of crops, are calculated in double decalitres, or in measures of fifths of hectolitres.

Table of product of the domain of La Croisette.

YEARS.	RYE.		WHEAT.	
	Seed.	Product.	Seed.	Product.
1822	110	600	24	146
1823	110	764	24	136
1824	110	744	24	156
1825	107	406	27	251
1826	106	576	28	210
1827	100	504	30	249
1828	90	634	36	391
1829	82	538	48	309
1830	60	307	60	459
1831	78	350	48	417
1832	55	478	68	816
1833	61	529	52	545

Table of product of the domain of Meyzériat.

YEARS.	RYE.		WHEAT.	
	Seed.	Product.	Seed.	Product.
1822	120	487	16	100
1823	120	708	16	103
1824	120	644	18	84
1825	112	504	28	228
1826	120	677	20	115
1827	115	594	20	162
1828	118	726	40	328
1829	104	566	41	277
1830	79	298	71	477
1831	91	416	43	326
1832	79	411	75	786
1833	76	616	48	351

Table of product of the domain of La Baronne.

YEARS.	RYE.		WHEAT.	
	Seed.	Product.	Seed.	Product.
1822	110	505	22	180
1823	110	643	22	138
1824	110	662	24	149
1825	102	393	32	252
1826	110	612	32	187
1827	107	546	34	204
1828	93	696	35	343
1829	84	608	40	268
1830	91	389	59	374
1831	92	411	40	295
1832	70	512	80	649
1833	75	511	51	471

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*An incorrect expression certainly, but literally translated. TR.

†We are unable to give the meaning, with certainty, of these provincial terms. They are probably equivalent to our "hard and soft" water—terms which are as little descriptive of what they mean, as the French "*eaux grasses*" and "*eaux maigres.*"

The application of 3000 hectolitres [8490 bushels] of lime, of the value of 6000 francs [$1116] upon 32 hectares [79 acres] of ground, made successively during nine years, has then more than doubled the crops of winter grain, the seed being deducted. The other crops of the farms have received a proportional increase; and the revenue of the proprietor, in doubling, has annually increased two-thirds more than the amount of the sum expended in the purchase of lime. Still, there is not yet half the arable land limed, since of 65 hectares, only 32 have received this improvement.

The products of 1834 are still greater than those of 1833. But these are sufficient to prove the importance and utility of applying lime to suitable soils.

Many other examples sustain these results; and from them all it appears, that the wheat seedings are increased from double to triple—that the rye lands, from bringing four to five [to one of seed] in rye, are able to bring six to eight in wheat—and that other products are increased in proportion. The melioration then is, relatively, much greater upon bad ground than upon good, since it is two-thirds and more on the wheat land, and on the rye lands the crop is increased in value three-fold.

Flemish liming.

13. The use of calcareous manures in the department of the North, as in Belgium, appears to be as old as good farming. It is now much less frequent in Belgium. The ancient and repeated limings have, as it seems, furnished to great part of the soil, all that is necessary to it, for the present. But the department of the North still receives lime, marl, or ashes, every where, or nearly so, where lime is not a component ingredient of the soil. They distinguish in this country two kinds of liming. The first [*chaulage foncier,*] consists in giving to the soil every 10 or 12 years, before seed time, four cubic metres, or 40 hectolitres of lime to the hectare.* They often mix with the slaked lime, ashes of dead coal, or of peat, which enter into the mixture in the proportion of from a third to a half, and take the place of an equal quantity of lime. The other mode of liming [*chaulage d'assolement,*] is given in compost, and at every renewal of the rotation, or upon the crop of spring grain. It is also in regular use in this country, still more than in Belgium, upon the meadows, on cold pasture lands, which do not receive the waters of irrigation. It warms the ground, and increases and improves its products. The older the compost is, the greater its effect, which lasts from 15 to 20 years, at the end of which time the dressing is renewed.

14. The limings of Normandy, the most ancient of France, are kept up in the neighborhood of Bayeux, while elsewhere they are forbidden in the leases: however, now they go over all the surface which has need of them; but in place of being applied immediately to the soil, as in the ancient method, the lime is almost always put in compost.

*46 bushels to the acre, English or American measure.

Liming of La Sarthe.

15. Of the modes of using lime, that of La Sarthe seems preferable. It is at once economical and productive, and secures the soil from all exhaustion. It is given every three years, at each renewal of the rotation, in the average quantity of 10 hectolitres to the hectare,* in compost made in advance, with seven or eight parts of mould, or of good earth, to one of lime. They use this compost on the land for the autumn sowing, and placed alternately with rows of farm-yard manure. This method, of which the success is greater from day to day, is extending on the great body of flat argilo-silicious lands, which border the Loire; and it would seem that this method ought to be adopted every where, on open soils that permit surplus water to drain off easily. On very moist soils, the dose of lime ought perhaps to be increased.

We would desire much to inculcate with force the suitableness, and eminent advantages, of using at the same time lime and [alimentary] manure. Here they do better still, in using at the same time a compost of lime with earth and dung. In addition, during the half century that the Manceaux have been liming, the productiveness of the soil has not ceased to increase.

16. The countries of which we have spoken, are those of France in which liming is most general. However more than half the departments I think, have commenced the use, and in a sixth, or nearly, it seems to be established. Doubtless, the first trials do not succeed every where. There is required a rare combination of conditions for new experiments, even when they have succeeded, to induce their imitation by the great mass. Still, successful results are multiplied, and become the centres of impulse, from which meliorations extend.

English liming.

17. The English limings seem to be established upon quite another principle from that of France. They are given with such prodigality, that the melioration upon the limed soil, has no need to be renewed afterwards. Whilst that in France we are content to give from a thousandth to a hundredth of lime to the tillable soil, from 10 to 100 hectolitres the hectare, they give in England from one to six hundredths, or from 100 to 600 hectolitres the hectare. The full success of the method of our country might make us regard the English method as an unnecessary waste. It seems that they sacrifice a capital five, six, ten times greater, without obtaining from it a result much superior; and that without lavishing [alimentary] manures also afterwards, that the future value of the soil would be endangered, in the hands of a greedy cultivator.

We will not urge the condemnation of a practice which seems to have resulted in few inconveniencies. The abundance of alimentary manures which the English farmer gives to his [limed] soils, has guarded against exhaustion: and then, in very moist ground, they have doubtless by the heavy liming, made the soil healthy, and its nature seems modified for a long time to come; and such kinds, and where *humus* abounds, will take

†11½ bushels to the acre.

up a heavy dose of lime, and as it seems, always without inconvenient consequences: there is then formed there the *humate of lime* in the greatest proportion, and we will see that that this combination is a great means of productiveness in the soil.*

Surface liming.

18. In Germany, where liming and marling, like most other agricultural improvements, have recently made great advances, besides the ordinary modes of application, lime is used as a surface dressing. They sprinkle over the rye, in the spring, a compost containing 8 to 10 hectolitres of lime to the hectare, fifteen days after having sown clover. Also on the clover of the preceding year, they apply lime in powder, which had been slaked in the water of the dunghill, the dose being less by one-half: the effect upon the clover and the following crop of wheat is very advantageous.

In Flanders, where they use lime mixed with ashes, it is particularly for the meadows, natural or artificial, and the application is then made on the surface.

Burning lime.

19. The burning of lime is done with wood, with pit coal, or with peat; in temporary kilns, or furnaces, in permanent, or in perpetual kilns. It is burned in many places most economically with coal, but it is not so good a manure as the lime burned with wood, because, as it seems, of the potash contained in the latter case. There are but few places in which peat is used for this purpose; however, in Prussia, they succeed with three-fourths peat, and one-fourth wood. It is, doubtless, a very economical process, and the *Société d'Encouragement* has given in its transactions plans of peat kilns; but I know not whether the operators who received prizes for their use, have continued the practice.

The temporary kilns admit of the burning of a great quantity of lime; but the permanent kilns burn it with most economy of fuel. In the first, 5 quintals of wood burn 4 quintals, or 1 ton, or $2\frac{1}{4}$ hectolitres of lime—and in the others, the same quantity of wood will suffice for 6 quintals, or $3\frac{1}{2}$ hectolitres. But in the permanent kilns such is the expense of construction and repairs, that they cannot be justified except when kept in frequent use. Coal burns from three to four times its bulk of lime—the shape of the kiln, the kind of limestone, and that of the coal, making the difference. Hydraulic lime is calcined more easily than the common [chaux grasse.] The egg-shaped kilns for coal seem to be preferable to the conical, which are more generally met with.

Precautions to be used in liming.

20. Whatever may be the method adopted for using lime, it is essential that, as with all calcareous manures, it should be applied in powder, and not in a state like mortar—and upon the earth when not wet. Until the lime is covered up finally, all rain upon it ought to be avoided, which reduces it to paste, or to clots: and this injures its effect greatly, and even more than reasoning can explain. It ought not to be placed but upon soil, the surface mould of which drains itself naturally [by permitting the water to pass through.] On a marshy soil, unless the upper layer has been well dried, or in a very moist soil, from which the surface water does not sink or pass off easily, the properties of lime remain as locked up, and do not make themselves seen, until, by new operations, the vegetable mould has been drained and put in healthy condition.

On an argillaceous and very humid soil, the use of marl, which is applied in great quantities, is preferable to that of lime, because that it can have a more powerful effect in giving the deficient health to the surface mould. On soil of this kind, a deep ploughing is a preliminary condition, essential to the success of either liming or marling: because in increasing the depth of the tilled soil, we increase also the means of putting the surface into healthy condition.

21. To secure the effect of lime on the first crop, it ought to be mixed with the soil some time before the sowing of the crop: however, if it is used in compost, it is sufficient that the compost may have been made a long time previously.

Lime, whether alone, or in compost, spread dry upon the soil, ought to be covered by a very shallow first ploughing, preceded by a slight harrowing, in order that the lime, in the course of tillage, may remain always, as much as possible, placed in the midst of the vegetable mould.

Lime, reduced to the smallest particles, tends to sink into the soil. It glides between the small particles of sand and of clay, and descends below the sphere of the nutrition of plants, and stops under the ploughed layer of soil: and when there in abundance, it forms by its combinations, a kind of floor, which arrests the sinking water, and greatly injures the crops. This is an inconvenience of lime applied in heavy doses, and is hastened by deep ploughing.

[To be continued.]

From the New England Farmer.

MUD FOR MANURE.

If you should find no mines of marl on your premises, worth working, it may be well to direct attentiou to what a geologist would call alluvial deposites, or the mud found at the bottom of ponds, rivers, creeks, ditches, swamps, &c. Some ponds are totally dried up, in a hot and dry summer; and all ponds and rivers are so diminished, by a copious evaporation, as to leave part, and the richest part, of their beds uncovered. And these beds, where there has been no rapid current, are always found to contain a rich mud. In some places, it reaches to a considerable depth. This mud, though taken from fresh waters, has been found to be a valuable manure, especially for dry,

*In this passage the author distinctly affirms the truth of the chemical combination in the soil of calcareous and vegetable (or other putrescent) matter—or the power of calcareous earth to fix and retain enriching matter—which is maintained in the *Essay on Calcareous Manures*, (pp. 30, 31,) to be the most important action of calcareous matter as an ingredient of soil. Still M. Puvis seems to attach much less importance to this than to other agencies of lime, which are considered in the Essay as of little value in comparison. TR.

sandy and gravelly soils. It has been known to have as good effect as dung from the barn yard, in the culture of Indian corn, on dry and sandy soils. The advantage of mud for manure is not limited to a single season, for it mends, as it were, the constitution of the soil, and restores to a hill side, or an elevated piece of ground, those fine and fertilizing parts which rains and snows have washed away.

But farmers on the sea coast have great advantages over others, as respects the use of mud for manure. The sediment of salt water, which may be taken up along the shores of the sea, contains some fertilizing substances not to be found in fresh water deposites, and abounds more than any other mud with putrified animal substances. If it be taken from flats, where there are or have been shell fish, it is calcareous as well as putrescent manure, and answers all the purposes of lime as well as of animal matters taken from farm yards, &c. The best manure, however, is obtained from docks, and from the sides of wharves in populous towns, having been rendered richer from sewers, the scouring of streets, &c., as well as refuse animal and vegetable substances fallen or thrown into such places.

Dr. Deane observed, that "mud that is newly taken up may be laid upon grass land. But if it is to be ploughed into the soil, it should first lie exposed to the frost of one winter. The frost will destroy its tenacity, and reduce it to a fine powder; after which it may be spread like ashes. But if it be ploughed into the soil before it has been mellowed, it will remain in lumps for several years, and be of less advantage."

A layer of mud is an useful ingredient in a compost heap, and should be underlaid, or overlaid, or both, with quick-lime, or horse dung covering the whole with loam or other rich earth. But a still better mode of disposing of all sorts of earthy manures, is to lay them in farm yards to be thoroughly mixed with the dung and stale of animals; and we believe this mode of management is in most general use by New England farmers. It requires more labor, and the increased expense of twice carting; but the advantage it affords in absorbing and retaining the stale of cattle, will be more than equivalent to such labor and expense.

From the Bucks County Intelligencer.

HOW TO GET RID OF THE BEE MOTH.

Conversing, a few days since, with an intelligent farmer in the south-west part of Bucks county, I queried with him relative to his success in raising bees, which were observed in a corner of his garden. I had noted nothing remarkable in the situation or position of the hives—neither was there any thing peculiar in their form—but the bees in all of them appeared uncommonly active. The farmer pointed to a number of boxes and calabashes, which he had placed in various parts of the garden, elevated in such a manner as to attract *wrens*, which I could perceive had established a residence in each of these simple and easily prepared apartments. These, he said, were the guardians of his bees; and they effectually protected the latter from their natural enemies—the mode of doing which he thus briefly explained:

"I raise the hive above the bench with little blocks at each corner, say from one and a half to two inches, so as to allow the wren to pass under it. This being done, the little domicils should be raised in different situations about the garden, taking care to have one or more of them contiguous to the bee-hives. The wrens will then watch the moth, with great assiduity, as I have frequently seen, often entering the hive after the miller, seizing it, and bearing it to its young, or devouring it on the spot. I have often seen the little bird enter the hive, and in the twinkling of an eye returning with its prey, without, apparently, disturbing the bees in the least, or even manifesting the least degree of fear, although the bees were on all sides. Since I have been in this practice," he continued, "I am not conscious of having had a single hive materially injured by the bee moth." I observed a number of the habitations above named, about the garden, and they all appeared filled with sticks, as if occupied by wrens. My friend observed that he found it necessary not to leave the door of the entrance too large—as blue, birds would sometimes take possession under such circumstances, and these were implacable enemies to the wren.

This little specimen of practical philosophy pleased me exceedingly, and set me to reflecting how much useful knowledge might be obtained by a little observation, and at a very small share of expense. While on the other hand, by neglecting to make a proper use of our senses, we are continually persecuting some of our most useful auxiliaries in the animal creation! Take as a specimen the unrelenting persecution with which we follow the king-bird, as a bee catcher! Experience has proved that this bird never disturbs the working bees—but a quantity of *drones* have frequently been found in their crops! The black bird is also proscribed; and he is destroyed without hesitation by every urchin who can carry a gun. But observation teaches us that the principal food of all the different tribes bearing this name, is the various families of noxious insects which infest our fields and orchards—among which may be classed those destructive worms which have committed such ravages on our corn fields the present season. The woodpecker and sapsucker have also been placed under ban, as enemies to the interest of the orchardist. But the enlightened Wilson has shown that they should properly be ranked among his truest friends. He also, if I mistake not, confirms the above trait in the character of the king bird. If our attention were more devoted to inquiries of this nature, besides the practical utility which would naturally result, we should, moreover, be taught a lesson of humanity, and learn how much a knowledge of the laws of nature is to be preferred before the crude notions and false prejudices which so much abound in the world.

"As he who studies nature's laws,
From certain truths his maxims draws."

AGRICOLA.

From the Troy Budget.

ELECTRO-MAGNETISM APPLIED TO MECHANICAL OPERATIONS.

An obscure blacksmith of Brandon, Vermont, sixteen miles south of Middlebury college, happened, accidentally, to become acquainted with Professor Henry's discoveries in electro-magnetism. Possessing one of those minds, which cannot be confined to the limits of a blacksmith shop —nor any shop less than the canopy of heaven—he applied this power (with which Professor Henry astonished the scientific world) to the astonishment of scientific mechanics. He turns three horizontal wheels around 50 times per second with this power. The wheels and shaft weigh eleven pounds. He has convinced Professors Henry and Bache, that the power is sufficient for strong machinery. A detailed account of it will appear in the next number of Silliman's Journal. The Hon. Stephen Van Rensselaer has purchased his first constructed machine (or model) for the Rensselaer Institute in Troy, as a piece of school apparatus. No chemical nor philosophical apparatus, can hereafter, be considered perfect without it. Whatever may be its fate in mechanics, it will cause the name of Thomas Davenport (the inventor) to accompany that of Professor Henry, to the ends of the earth.

AMOS EATON.

Sen. Prof. in the Rensselaer Institute.

N. B. Professor Bache of Philadelphia, and Prof. Turner of Middlebury, Vermont, have given opinions in writing, which I have before me, (after examining the machine in operation) that Mr. D's. application of Prof. Henry's discoveries may be made to move heavy machinery for useful purposes. According to their views, another Livingston might make another Fulton, of the Brandon blacksmith.

From the Cultivator.

DEAR FRUIT.

Loudon's Magazine for June quotes the price of peaches in Covent Garden market, at £3 ($13.32) per dozen, about 111 cents each!—cherries at £1 to £1 10s. per lb.—and strawberries at 1s. 6d. (22 to 33 cents) per ounce! These were of course of forced fruit.

Extracts from a Lecture delivered by Doctor Birkbeck, at the Society of Arts, Adelphi; December 9, 1834.

ON THE PRESERVATION OF TIMBER BY KYAN'S PATENT OF PREVENTING DRY ROT.

We have heard persons assert that it appears to them almost ridiculous to suppose that it ever can become necessary, on a large scale, to perform any operation with a view to render timber durable, beyond that of properly seasoning it by exposure to the atmosphere. But is not this mere prejudice? Why should not timber be prepared by a particular process, which conveys something additional into it, and thereby effects a a chemical change in its nature, as well as leather is tanned?

"A very effectual procedure has taken place, in regard to one form of animal matter, by the preservation of the skin from natural decay, by a process known by the name of 'Tanning.' This process will give a very good idea of Mr. Kyan's invention. Tanning consists in protecting the leather and skin by the introduction of tannin, which is generally derived from an infusion or decoction of the bark of the oak. If no change were produced in the gelatine, which makes the largest part of the skin to be immersed in the tan-pit, it would undergo certain chemical changes—it would putrify, and lose its tenacity; but if a portion of animal jelly is dissolved in water, and a little of the substance added, similar to the tannin, a combination will take place between the gelatine; a precipitate will follow of the animal matter, which is the tanno-gelatine, or a compound of tannin and gelatine, and is precisely that substance which is formed in the leather, and gives durability and power to resist the causes of decay. The same intention exists in the process of Mr. Kyan. It is true he does not act on the gelatine of animal matter; but he does on the albumen: one of the approximate principles of vegetable matter, which appears to have been slightly perceived by Fourcroy, but which was actually discovered by Berzelious, about the year 1813.

"In order to obtain this vegetable matter *(albumen,)* there are various substances which may be employed. The hibiscus esculentus yields it in considerable abundance: it is a West Indian plant, which Dr. Clarke mentions as adopted in Demerara, for the same purpose as in other islands the white of eggs and blood are employed in the process of clarifying sugar. The ficus indica, also, if divided at the stem, will exude a considerable quantity of this matter. If the solution of the bi-chloride of mercury (which is the agent adopted by Mr. Kyan) is added to the vegetable matter, albumen, it will be found, when they come in contact, that decomposition occurs."

"Mr. Kyan, who had been a series of years (since 1812) engaged in trying a variety of experiments on the preservation of timber, was led to the present experiment by having, as he conceived, at length ascertained that *albumen* was the primary cause of putrefactive fermentation, and subsequently of the decomposition of vegetable matter. Aware of the established affinity of corrosive sublimate for this material, he applied that substance to solutions of vegetable matter both acetous and saccharine, on which he was then operating, and in which albumen was a constituent, with a view to preserve them in a quiescent and incorruptible state, and obtaining a confirmation of his opinions by the fact that, during a period of three years, the acetous solution openly exposed to atmospheric air had not become putrid, nor had the saccharine decoction yielded to the vinous or acetous stages of fermentation, but were in a high state of preservation; he concluded that corrosive sublimate, by combination with albumen, was a protection against the natural changes of vegetable matter."

"The mode in which the application of the solution takes place, is in a tank similar to the model on the table. They are constructed of different dimensions, from 20 to 80 feet in length, 6 to 10 in breadth, and 3 to 8 in depth. The timber to be prepared is placed in the tank, and secured by a cross beam to prevent its rising to the surface.—The wood being thus secured, the solution is then admitted from the cistern above, and for a time all remains perfectly still. In the course of 10 or 12 hours the water is thrown into great agitation by the effervescence, occasioned by the expulsion of the air fixed in the wood, by the force with which the fluid is drawn in by chemical affinity, and by the escape of that portion of the chlorine or muriatic acid gas which is disengaged during the process. In the course of 12 hours this commotion ceases, and in the space of 7 to 14 days (varying according to the diameter of the wood) the change is complete, so that as the corrosive sublimate is not an expensive article, the albumen may be converted into an indecomposible substance at a very moderate rate."

After stating the result of various experiments, Dr. Birkbeck concludes by observing that this discovery is yet in embryo, but that the public benefit that will result from it is beyond calculation. In an *Appendix* the various purposes to which the process is applicable are detailed: such as preventing dry rot, seasoning timber, protecting from insects, applying the process to Canada and British timber, and preserving canvass, cordage, &c. from mildew.

"Canada timber is much more liable to decay than that grown in the northern parts of Europe, and for this reason is never used in buildings of a superior description. The principal of decay being destroyed, as above shown, this objection is no longer in existence; and this kind of timber may now be employed with as great security as that of a superior quality and higher price.

"The same observation applies with great force to timber of British growth, particularly to that of Scotland, much of which is at present considered of very little, if any value for durable purposes, on account of its extreme liability to decay, whether in exposed situations or otherwise. The present process will therefore render of considerable value, plantations of larch, firs of all kinds, birch, beech, elm, ash, poplar, &c., which are the chief products of the great wooded estates, and which, when prepared, may be advantageously employed to most useful purposes."

"*Purposes for which the prepared timber &c., would be highly useful.*—Houses, farm-houses, out-houses. Large timbers, floors, roofs, gutters, &c., furniture and all joiner's work, preserved from dry rot, and perfectly seasoned. Posts, rails, gates, park pailing, fences, hop-poles, felloes, spokes, shafts, &c. &c. For these purposes any kind of timber may now be used, instead of the more expensive kinds. It will also supersede, in many cases, the employment of iron, from its acquired durability and greater economy."

The additional expense of preparing timber for buildings, such as farm-houses, out-houses, &c. in Mr. Kyan's manner is estimated at the very moderate sum of 20s. per. load.

From the London Mechanic's Magazine.

MODE OF PRESERVING MILK FOR LONG VOYAGES.

Provide a quantity of pint or quart bottles, (new ones are perhaps best;) they must be perfectly sweet and clean, and very dry, before they are made use of. Instead of drawing the milk from the cow into the pail, as usual, it is to be milked into the bottles. As soon as any of them are filled sufficiently, they should be immediately well corked with the very best cork, in order to keep out the external air, and fastened tight with packthread, or wire, as the corks in bottles which contain cider generally are. Then, on the bottom of an iron or copper boiler, spread a little straw; on that lay a row of the bottles filled with milk, with some straw between each, to prevent them from breaking, and so on alternately, until the boiler has a sufficient quantity; then fill it up with cold water; heat the water gradually until it begins to boil, and as soon as that is perceivable, draw the fire. The bottles must remain undisturbed in the boiler, until they are quite cool; then take them out, and afterwards pack them in hampers, either with straw or sawdust, and stow them in the coolest part of the ship. Milk preserved in this way has been taken to the West Indies and back, and, at the end, of that time, was as sweet as when first drawn from the cow.

From Lorrain's Husbandry.

EXPERIMENTS IN TOPPING CORN.

It was discovered early in August, 1810, that proper grasses for soiling my cattle would soon be very deficient; and on the 20th of that month, one row of corn in a field of thirteen acres, was topped to ascertain how the plant would bear early cutting. It was thought that it had received no injury. On the 21st of the same month I commenced feeding the cattle with the tops cut daily as wanted. These lasted them until the 18th of September. After this, the blades were stripped, commencing where the toppings began. They fed the cattle until the 5th October.

In the process of topping and blading, one row was left entire, standing between the row which had been topped on the 20th of August, and another row which was topped on the 2d of September. These rows were cut off by the roots on the 2d of October, and hauled in, and set up separately under my own inspection. They were husked and measured on the 8th November.

Produce of the row that had not been topped and stripped, nine bushels and five-eighths of corn in the ear.

One of the rows which had been topped and stripped, measured seven bushels and six-eighths: and the other topped and stripped row measured seven bushels and three-eighths of corn in the ear.

Thus it clearly appears that mutilating the corn plant before its fruit is perfected, is a very injurious practice. The injury done to my crop by this mode of management was clearly seen some time before the three experimental rows were cut off. Throughout the whole field the husks were generally dry and open, except on the row which had not been topped and stripped. On this they still retained a greenish hue and were close set to the ear when the plants were cut off by the roots.

1811, I selected three rows of maize in the middle of my field, as nearly alike as possible. The plants were then about two feet high. I cut off the tops of the middle row as low down as might be readily done without injuring the tassels, which were wrappid in their own leaves within the stalks. I could not observe that the stalks in the row which had been cut, grew any thicker, until new leaves had been formed from the crown of the plants. Before this happened, the stalks in the rows on either side of it seemed to be as thick again as those standing in it; and the ears grown on the plants in this row, shot, filled, and ripened about two weeks later than the rest of the field.

As several writers on agriculture had asserted that the tops of potatoes might be cut and given to the cattle without injury to the crop, I cut off the tops from a row running through the middle of a very luxuriant patch. Care was taken to cut them in that way which was supposed least likely to prove injurious to the future growth of the plants. The debilitated appearance of the second growth of the tops, determined me not to risk the second cutting of them. When the crop was gathered, the roots in the row that had been cut did not seem to be more than half as large as those in the rest of the patch.

In fact, I have never seen any advantage arise either from carefully trimming, or ruggedly mutilating annual plants; on the contrary, much injury certainly follows. It is, however, probable that good housewives and ignorant gardeners will continue to trim and mutilate the tops of their onions, as long as the world may happen to last, for the express purpose of making the roots grow more luxuriantly; unless perchance, they may happen to reflect, that the tops would not have existed, if nature did not consider them as necessary to the well-being of the plant as its roots. Certain it is that the writings of many gentlemen who ought to have known better, are exactly calculated to confirm them in this truly savage practice.

From the Genesee Farmer.

MANAGEMENT OF BEES.

Mr. Tucker—In the Genesee Farmer of August 1st, one of your subscribers from Onondaga county writes—"I commenced keeping bees last spring on the plan of Ulmus, in a long box, &c. but they have sent out swarms as usual, although there is room enough at home. I wish I could find some certain way of managing them, other than in separate hives." R. Honey, also, of North Union, says—"I wish that some of our correspondents would be so kind as to give a description through the medium of the Farmer as to the *best* mode or manner they know of, by experimental knowledge, of constructing a bee house, and give the particulars of the internal regulation and arrangement of their hives, boxes, &c. together with the improvements they may have made," &c.

In compliance with their wishes, and those of other gentlemen similarly expressed through different channels, I send you a statement of the manner in which I have managed my bees of late, together with a description of the hive recently invented and patented by me. I would remark that I have kept bees in a hive of the description given below four years, and in all that time they have shown no sign or inclination for swarming; and in consequence of ventilating the hive in the manner I do, they have never been driven outside the hive to take fresh air, as they often are out of our old fashioned hives for no other reason than that the air becomes so heated as to be insupportable within.

The hive should be made of boards, of a size say three feet high, three feet eight inches long, and one foot eight inches deep, (standing on legs like a bureau,) or any other convenient size, to suit the taste of the builder. This should be set in a room in the upper story of a house, or other building, with the backside against the wall of the building. In the front side of this hive should be a door sufficiently large, (say two feet high from bottom, by one and a half feet wide,) to open and examine the internal concerns of the hive at pleasure. This door should be cased within, and hung with hinges in the ordinary way, with a wooden button or a lock to hold it fast when shut. The cover to the hive also, which should be made of a board an inch thick, should be hung with hinges on the backside, precisely in the manner of a chest lid, and may have a lock to fasten it in front, if necessary. The cover should project over the hive in front and at the ends, sufficiently to receive mouldings underneath. These mouldings, as also the casing inside the door, will be essentially necessary, in order to hide the cracks and thereby shut out all destructive insects, and also to exclude the light. Underneath this cover, in the top of the hive, are to be four small open boxes, each extending from the front to the backside of the hive, and sufficiently wide, so as in the aggregate to just fill the top of the hive. They should fit so close as not to admit of the bees passing up and down around the sides of the boxes, and they should each be about ten inches deep. They should be placed in an inverted position in the hive, and should rest upon a tier of slates, or narrow strips of board, extending from end to end of the hive, and placed at about half or three-fourths of an inch from each other. About one foot below these slats should be placed another tier, in like manner as the first, with the exception that the last may be placed a little wider apart than those on which the boxes rest. These tiers of slats should severally rest upon two narrow strips of board nailed or screwed on the end boards of the hive, and the slats themselves should all be fastened in their places by nails or screws.

It is intended that the bees, in their accustomed manner of working, shall first fill the boxes, then work from the slats below down to the second tier of slats, and from these again down to the bottom of the hive. In the back side of the hive should be three apertures, which should extend through the wall of the house or building, into which three tubes should be inserted of sufficient length to reach from the inside of the hive to the outside of the house, the ends being cut slanting on the upper side to make a lighting place for the bees. These tubes should be placed in a triangular position, one above and two below. The upper one should enter the hive just below the upper tier of slats on which the boxes rest. The entrance through this tube should be four inches wide, by half an inch deep. The two lower tubes should enter the hive just below the second tier of slats, and should each be three inches wide, by half an inch deep. All the tubes should be inclining a little downward from the inner to the outward ends, that the water from without may drop off at the ends, and not run into the hive. These tubes should be the only places for the bees to pass into and out of their hive. In the four boxes above mentioned, there should be holes cut three inches wide by half an inch deep near the upper side of the boxes, so that the bees may pass freely from one box into another, as occasion may require. There should also be three small apertures cut in the side of the boxes directly over the holes last mentioned, to the top of the boxes, three inches long by one-fourth of an inch, or a little more, in width, extending up to the cover of the hive. These should be covered by a piece of millinet laid loose on the top of the boxes, to prevent the bees passing up through them. In the cover of the hive should be formed three grooves, extending from the apertures last mentioned, to within about an inch of the back side of the cover, and there intersecting a mortice leading from thence to the back side of the cover. This mortice it will be seen, must be cut in the edge of the board forming the cover, and should be three inches long by half an inch deep; and should be covered on the outside by a piece of fine wire screen, or a piece of millinet, sufficiently open to admit a free circulation of air through it, but not so open as to admit of flies or other insects to pass in. This mortice and those grooves, in connection with the apertures below, are to serve as a draft through which the heated air in the hive and the perspiration of the bees may escape, while at the same time a constant supply of fresh air from without is conveyed in through the tubes.

When a hive of this description is obtained, the bees should be hived into one or more of the small boxes and placed in the hive, or if they are already in a hive of common construction, by turning it bottom side up, and placing one box at a time on the top of it, they can easily be driven into the boxes and placed in the hive, where they will immediately go to work. Here they will remain perfectly secure, and neither disturb the inmates of the house, or be disturbed by them.

Some of the benefits to be derived from the management of bees in the manner here recommended may be stated as follows, viz:—1st. By keeping bees in the house, the owner, or bee master, may exercise absolute control over his property, and instead of having it wrested from his hands improperly, appropriate it to his own use. 2nd. The bees would be secure from the inclemency of the weather; neither the scorching rays of a summer's sun, or the chilling winter winds, would effect them; they would also be kept both dry and comfortable, and consequently healthy. 3d. They would be secure from destroying insects. The hive should be so perfectly tight within the house, that nothing could molest them: and the tubes being the only entrance from without, it is believed they will be too high and too much secluded for insects, especially the bee moth, that fell destroyer of the honey bee, to enter. 4th. They may be carefully examined at all times, to see if an enemy gets among them, and also how they progress in their work. 5th. They will not be subject to losses by swarming, as it is well known that bees will never swarm while they have sufficient room for their operations. If, however, they should become too numerous at any time to occupy one hive to advantage, they may be divided in the following manner, viz: prepare another hive of the same size and construction with the one the bees occupy, place it in the room where it is to stand, then in a stormy day or evening, when the bees are all in their hive, take out all the boxes, with all the bees that may be in them, and place them in the new hive, and put the boxes belonging to the new hive into the old one at the same time. This will divide them nearly equal, and if either becomes too numerous again, divide them again in the same manner, (or connect the two hives by a tube, so that the bees can pass from one into the other,) remembering always to stop up the tubes of the old hive for one or two days after dividing a swarm, or until the bees in the new hive begin to work well in and out of the tubes of their new habitation; then unstop the tubes and all will work well. 6th. Honey may be taken from them at any time, even in the midst of summer; if the owner wishes a box of fine white honey, he has but to take a spare box with him, and take out one of the boxes, supplying its place with the spare one; then take the box out of doors and turn it bottom side up, and rap on it until the bees all leave it. The bees will all return to their hive again, while the owner may enjoy in an eminent degree the fruits of their industry. 7th. The owner should be careful to leave honey sufficient in the hive for the use of the bees through the winter, which he may well afford to do, as it is well known that 10 or 12 pounds will winter a swarm of common size, even as far north as latitude 42 or 43°. Then in the spring the whole should be taken away, first by clearing the boxes above, and then by cutting the combs from the slats below.* The boxes may be cleared by taking them out of the hive, one at a time, turning it bottom side up and placing an empty box on it, and driving the bees into the empty box, which place in the hive. This may be done in a cool day in the spring without any danger to the one who performs the operation. This is the great desideratum in the art of keeping bees, and with hives of this construction you can take from them all the honey they have to spare, and still preserve their valuable lives. 8th. Bees work better in a hive that is empty, than in one that is full; and by clearing it out wholly once in the year, and partially at other times, they will always have room sufficient for their operations. 9th. Honey is far more delicate and more valuable when new than when it has been a long time in the hive; and by this process we may always have new honey. 10th. Bees kept in this manner would be much less liable to be robbed by other swarms. Being kept in the house they would be more secluded; other bees would not be so likely to be attracted thither by the smell of honey, and in the course of one or two years, they would become so numerous as to be able to repel any invasion of ordinary swarms. 11th. By keeping the bees in the manner here recommended, they can as well be kept in large towns and cities, as in the country, which is not the case when kept in the open air and on or near the ground. 12th. As a matter of profit, it is confidently believed that bees kept in this manner, will pay some hundred per cent. more on the capital invested, than any other stock our country will produce; yet instead of producing our own, we import a great quantity of honey every year.

The only improvement I would suggest on the above plan, is, simply, to lay a small piece of board, say 10 or 12 inches square, in the hive on the bottom, so that if a bee miller gets into the hive she will deposite her eggs under the edges of the board. Then by opening the door and re-

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*If this operation is performed full early, and it should be early before the breeding season commences, otherwise a quantity of eggs or young bees might be destroyed, a little honey should be left in one or more of the boxes, for the use of the bees until the spring flowers open.

moving the board occasionally, say once a week, you may destroy all the young worms before they get among the bees to do any harm. If by opening the door for this or any other purpose, some few bees should fly into the room, as they often do, it is easy to hoist a window and let them out, when they will immediately return to their hive.

Some people might apprehend that bees kept in the house would be troublesome to the family within, but this is not the case. The room might be used for any other purpose as well as though the bees were not there. When the door to the hive is shut and the lid closed, as they ordinarily would be, there is no possibility of the bees getting into the room unless they come in from out of doors, and if they should at any time come in through a door or window, they will be as anxious to return as the most timid could desire. When in a room they will often fly against a glass window until, wearied with exertion, they will drop down and die, if they can find no way out.

* * * * *

LEVI H. PARISH.

Brighton, (near Rochester,) Aug. 10th, 1835.

REMARKS ON PRICES AND PRODUCTS OF LANDS.

To the Editor of the Farmers' Register.

Charlotte, Aug. 19, 1835.

If the writers for the Register would each give some general description of the lands in his neighborhood, of their adaptation to the production of this or that staple, the average amount they will produce per acre, and the prices at which they sell, or could be purchased, it would be a great convenience to those who are looking out for homes, and might be the means of giving a check to the tide of emigration which is desolating our country. I am myself desirous of selling my land that I may purchase elsewhere, with the same money, a larger plantation. Good lands well suited to the production of tobacco, cannot be bought in this county for less than $10 per acre, and have ranged from that to $15 for the last twenty years, while those of inferior quality, range between $3 and 10. Now, there may be sections of my native state, where lands are selling much lower than this, and where I might be induced to locate myself were I in possession of the requisite information. And certainly your periodical affords a medium through which such information might be imparted. For instance, if the lands on the lower James River are of great fertility, and selling at low prices, and that fact known to the people of middle Virginia, might not many who are seeking the rich valleys of the west and southwest, direct their attention that way?

There are many, Mr. Editor, who are driven by stern necessity, to seek an asylum in the west, who would prefer remaining in Virginia, if with their means they could purchase land on which their families could be supported. But the great body of our planters are home-staying people, and are in fact ignorant of the quality of the lands in their own state, while their intercourse with their friends who have emigrated to the west, is the means of making them acquainted with both the cheapness and quality of the lands there. Would it not be wise in land-sellers to advertise their prices, the average product of their land per acre, and the description of crop raised?

I live in the heart of a fine tobacco country, where the best planters raise from 1000 to 2000 weight of tobacco to the hand, and from $1\frac{1}{2}$ to 4 barrels of corn to the acre.

There is some agricultural improvement here; but where one man is improving his lands, five are murdering them. Plaster operates like a charm. An agricultural society has been established here, but it receives very little encouragement from the land-killing *gentry*.

We have here a host of destructive insects called *chinch-bugs*, from the odor which they emit. They infest the corn, wheat and oats, in such numbers as to produce, in some instances, a total failure of crops. They are worse than drought. When the wheat is cut they march in a column, which blackens the earth, to the corn field, and settling on that, they soon exhaust the whole of the sap, and leave the plants lifeless and dry. The man who would discover a remedy for them would be a benefactor to this section of country. They made their appearance here about fifteen years ago, and I think, are becoming more and more destructive. How far their ravages extend I am not able to say. Can you tell us where they come from, and whether they are common throughout Virginia, and also whether they are to be found elsewhere? Has any remedy been found for them, and what is it?

Committees of the agricultural society are now examining into the condition and management of the farms of members of the society. I suppose they will lead the people to the first step towards improvement, *the knowledge of their faults*.

P. S. A communication in your last number on the subject of the lands of Northampton, is a very excellent specimen of the plan I propose to the writers for the Register, in regard to the lands in their respective counties.

SOILS, AND AGRICULTURAL ADVANTAGES OF THE FLORIDAS.—No. 3.

To the Editor of the Farmers' Register.

Plantation Wascissa, Aug. 26, 1835.

My preceding letters must limit for the present, further observation on the soils of the eastern district. Desultory and brief as they necessarily have been, I yet hope they have proved sufficiently interesting to excite the attention of emigrants, to an examination of the lands they feebly describe—and for which there can be no period so propitious as the present autumn; as from the certain removal of the Seminoles during the coming winter, speculators are already anticipating a rich harvest in the selection of choice tracts. Assuredly these lands, so happily located for the Atlantic market, and sea ports, and blessed with the security of our own unrivalled government, *must be* more eligible for the American emigrant, than the far distant and revolutionary Texas.

I proceed westward on my route of observation. From the confines of Alachua to the banks of the Suwanee River, are found the barren wastes, which detract so largely from the otherwise verdancy of Florida. The country, for many miles inward from the gulf, is here one continuous, unvarying and steril pine forest: and the traveller leaving the rich alluvials of Alachua, with their varied and umbrageous forests, becomes sadly "out of conceit with the country," as, mile after mile, he still finds his desolate road extending over an eye-fatiguing flat, whose only growth, as far as sight can reach, is the stiff, branchless, and monotonous pine—whilst the earth, a dazzling white sand, is exposed to the clear rays of a tropical sun, without even the protection of grass or shrub.

This continues with little alleviation or improvement, for upwards of 50 miles, to the borders of the Suwanee, when the traveller hails with the feverish delight of an Arab, the majestic live oaks, indicating the banks of that long wished for stream. I need not attempt a minute analysis of these purely southern barrens. No one, I apprehend, will be attracted thither, be the magic of my pen ever so persuasive. It is enough therefore, to say, that superficially, it is a white gravelly sand, which, on deeper examination, is found based on a cold clay of yellowish complexion, so strangely cohesive, as to form an indissoluble and distinct mass between the sand and the substrata of coarse lime shell. This section is almost entirely without settlement. Its dwarfish and stunted pine sufficiently attest in their *monopolizing* growth, its barrenness—whilst the want of wholesome water, and the absence of all pasturage, have caused even the restless "Squatter" to shun its desolation.

Before taking leave of the eastern district, having now reached its western limit, I may with a candid acknowledgement of my superficial knowledge of the science, express my conviction, that its geological character, especially east of the St. John's River, is entirely of a secondary and transitive formation. We find no evidence of a primitive organization, neither silex, quartz, nor any of the combinations of mica. Every examination of soils on the other hand, exhibit throughout the peninsula, the unvarying presence—first, of testaceous shells, and sea sand—second, of crustaceous shells, marsh mud, with putrescent *saline* vegetables—and third, of gravelly earth, with decomposed and fibrous vegetable matter. The proportion of these organic strata are doubtless variable, creating in their different excess, the rich alluvial bottoms, and less fertile uplands—the former indicating a *later* alienation from the sea, and the latter a longer exposure to terrestrial vicissitudes.

The Suwanee is the boundary, dividing the eastern and middle districts; but ere we cross it, let us momentarily admire its bold and picturesque banks—its pellucid waters, so

"Darkly, deeply, beautifully blue—"

and its silent, meandering, yet swiftly gliding course. Its tributaries take their rise in the southern parts of Georgia, and are many of them of great length: but it is not till after their junction with the soft-named and sombre With-la-cov-chic, that the Suwanee is every inch the monarch. It is immedialely below this "meeting of the waters," that arise the notable "Sulphur Springs," and which if Rumour be not false-mouthed, promise to realize, in their efficacy, the long sought for "Fountains of Youth," of De Leon, and De Soto. I have not *as yet* been *credibly* informed, that these springs have caused

"Decrepid age to smooth his wrinkled front—"

but I have witnessed some surprising and permanent effects upon bed-ridden and deformed cripples, who had for years ne'er trod the earth, until resuscitated by a draught of these magical waters. Obstinate rheumatism, long endured dyspepsia, and affections of the liver, are radically cured, and with astonishing celerity. The magnitude of the spring being sufficiently large to allow crowds to bathe at the same time, and its temperature being delightfully cold, many resort thither merely for amusement. There is little doubt of these springs rising in notoriety. The waters are composed of sulphur, nitre, magnesian earth, and carbonic acid. Buildings are now being erected suitable for the accommodation of invalids and tourists. From the site of the springs, the Suwanee continues, through the centre of Florida, dividing it almost equally, to the gulf, a distance of nearly 100 miles, a broad, expansive, and navigable stream.

Projects are now in contemplation, with every promise of consummation, to render this hitherto *profligate* river, subservient to the uses of man. A charter was last year obtained, incorporating a company, to establish, by means of steam boats up the Suwanee, and a rail road across to the St. John's, a line of internal communication, connecting the waters of the gulf and Atlantic: and which, on accomplishment, will not only expedite the intercourse between New Orleans and the Atlantic ports, and lessen the present hazardous navigation, but will more immediately benefit Florida, in creating a rise in the value of her widely vacant lands.

Crossing the Suwanee, we enter upon a part of Hamilton county, and the appearance of the country is very much of the same character as was described on the eastern bank, the only difference being perhaps, a slight improvement in the soil, from the putrescence of a thicker foliage, but generally, until we approach the "*Oscilla flats*," a distance of some forty miles, the same sandy level, interspersed with "Byegals," and lime sinks, and covered with gaunt pine trees, which here correctly exhibit Euclid's definition of a straight line—as "*length without breadth*," continue to weary and disappoint the wayfarer. The banks of the Oscilla, however, seem the magic boundary of good and evil—for, whilst on the one side are visible, verdant and diversified hills—on the other the eye is fatigued with the wide spreading flat of branchless pines. I must not here allow myself to be understood as asserting the absence of good lands, throughout the extensive section lying between the rivers Suwanee and Oscilla. In such assertion I should be erroneous. My meaning only includes that section of country exposed to the traveller's gaze. To the right and northward of this route, though distant from view, there is an extensive section of some most superior lands; and I little risk contradiction in declaring that the middle and western portions of the county of Madison, contain large tracts of land inferior in richness and variety to none to be found in the middle district. I allude particularly to the settlement known as "Hickstown;" and it is my regret that the want of personal inspection compels me thus briefly to dismiss the notable superiority of the "*Hammocks,*" in that settlement. Faithful and disinterested reports have described them to me as being of a dark chocolate complexion, and dense with a luxuriant growth of magnolia, wild cane, tulip and dogwood.

The county of Hamilton bordering the Suwanee on the west, is the first we enter, of those constituting the middle district. The county of Madison is adjacent, and together, they comprise the country lying between the Suwanee and Oscilla rivers, from the line of Georgia to the gulf. Next thereto, being the western boundary of the Oscilla, lies Jefferson county, and beyond it on the west, the counties of Leon and Gadsden. These five counties, contiguous to each other, and containing some 2500 voters, or thereabouts, constitute the "*middle district of Florida,*" and are bounded on the north by the state of Georgia—on the east by the Suwanee river—on the west by the Apalachicola—and on the south by the gulf of Mexico. It is this district which essentially deserves our most labored attention—for whether it be from fortuitous or intrinsic circumstances, it cannot be denied, that at present, it is prominently first, above all other sections in the territory, in general prosperity.

It is not the province of these letters to investigate the causes which have led to this prominence of sectional improvement, farther than those may have originated from agricultural success. Doubtless it has been much owing to the enterprise and intelligence of her denizens, as well as to those *local* advantages which might arise from her immediate proximity to her sister states, and her possession of the seat of government—or to her *natural* advantages of varied richness, good water, and picturesque landscape. Be it however from one or all these hypothetical causes, I may, as an indisputable evidence of her *actual* increase of wealth and population, state that her cotton exports for 1827, were only 338 bales—whilst they amounted last year, (1834,) to 15,870 bales, of increased weight. This fact taken from the published annual custom house report, so strongly indicating an improvement in agriculture, immediately concerns the aim of these letters, and invites the consideration of the *producing causes,* which my next letter, I trust, will be enabled satisfactorily to exhibit, as originating in the rich soils, and improved advantages, of the middle district.

FARQ. MACRAE.

From the Silkworm.

INSTRUCTIONS IN THE ART OF MANAGING SILKWORMS.

[Chiefly compiled from the work of Count Dandolo, Milan, 1824. 4th edition.]

Translated from the Italian. New York, April, 1834.

By Charles Rhind, Jun.

The following instructions are adapted to five ounces of seed or eggs. If the quantity be increased, the space they occupy, and the nourishment given them, can be increased in proportion.

As the worms produced from this quantity of eggs will, in their last age, or stage, occupy 500 yards of grating, the room for this purpose should be capable of containing on each side 10 yards of grating, and have sufficient height to receive 5 frames horizontally, and leave room to walk round them. If the height is greater, the other dimensions may be smaller.

General observations and implements.

The room where the silkworms are raised should have, at least, one door and one window, and it would be better there should be two or more. The windows should be glazed, that the light may enter, not only for the convenience of attending to the worms, but also for their health, as darkness is injurious to them. They should not, however, be exposed to the rays of the sun.

They should be ventilated, if possible, both in the floor and roof, or, on a level with both, to open and shut by slides. One of the low ventilators should be made in the door.

There should be a stove, and one or more chimney places. The chimney place is of much use to burn straw or chips when a blazing fire is requisite for changing the air. The stoves serve to heat the room at any time. A Franklin stove will answer both purposes.

One or two thermometers and a hygrometer should be kept in the room to regulate the heat, and determine the degree of humidity or dryness.

Another appendage is necessary to purify the air when it becomes deteriorated by the exhalations of the worms and their excrements, the putrid leaves which collect, the breath of attendants, or the use of lights at night. This consists of a bottle of strong glass, and a large mouth, with a cork stopper, and a smaller bottle. In the last is put one pound oil of vitriol (sulphuric acid,) kept well closed with a ground glass stopper. In the larger bottle put six ounces common salt, three ounces powdered manganese, mixed with two ounces water, or one pound saltpetre. Pour on the mixture of salt, manganese, and water, or on the saltpetre, a spoonful or small wine glass full of oil of vitriol, and a white vapor is produced which purges the air. This vapor is not only more wholesome, but less disagreeable to those who breathe it. It may also be obtained by a mixture of two-thirds of pure nitre and one-third manganese, pounded and well mixed together, placed in a spoon or wine glass, on which are poured a few drops of oil of vitriol. This process may be repeated as often as necessary to purify the air.

It is also necessary to have cartoon boxes, in which to place the eggs, and others on which to place the worms when they are produced, and small tables, or baskets with a handle.

Preparations for hatching the worms.

Those who, in the preceding year, have purchased the seed, (eggs,) and have them in the cloths where the worms laid them, ought, on the approach of the proper season, to prepare them. This is the mode:

Plunge in a pail of pure water the cloths containing the eggs, and leave them there about six minutes. Take them out, let them drip for two or three minutes, spread them upon a table, and with a scraper, or knife, not very sharp, separate the eggs from the cloths. Put them in a basin and pour water on them, gently stirring them. Those that are not good will float, which can be skimmed off and thrown away. To take the rest from the water, filter them on a rag. Put them in a clean basin and wash them again with some sound light wine, and gently stirring or rubbing them. White is preferable to red wine. Strain off the wine, spread the eggs on cloths, place them on a tight floor, or on gratings, and in two or three days they will dry. When they are well dried, put them on pewter plates, or copper tinned, in layers, not more than half a finger high, and keep them in a fresh, dry place, free from mice, until the time for hatching them.

The greater number of cultivators of silkworms buy the seed. The color should be well looked to. It should be bright gray or ash color. The yellowish or reddish eggs do not generally produce any thing. The white have already produced.

To hatch them, artificial heat is requisite. This is produced by the stove. The eggs should be placed in cartoon boxes, in proportion to the quantity they are to contain. A box six inches square, with sides half an inch high, is sufficient for an ounce of eggs. Number the boxes. There should in the room be tables or gratings jutting from the wall, and an inch apart from it. If there are many of them, place one above another a yard apart. Place the boxes on the grating so that they may be conveniently examined. Let them be kept separate, that the worms may not pass from one to the other.

Place the thermometer near the boxes to ascertain accurately the heat of the place, as the chamber may not be uniformly heated, the heat being greater in the higher than in the lower part of the room, and nearer the stove than at a distance.

The eggs which are kept in the warmest place are soonest hatched. The overseer should have a man with a book to note down his observations. He should note down: 1st, the number of each box, and the quantity of eggs it contains; 2d, the day and hour in which the worms are hatched; 3d, the quantity of leaves that he gives them; 4th, the degree of the thermometer and hygrometer; 5th, whatever may appear worthy of observation.

Hatching of the worms.

When every thing is prepared, and when the mulberry trees have put forth their leaves, so that after ten days they may supply the aliment necessary for the worms that may be hatched, the overseer puts the eggs in a box, and marks the observations mentioned in the preceding chapter. The temperature of the chamber near the place where the eggs are put, should be 63½°; this is obtained by increasing the fire, should the temperature be less, and by opening the ventilator, and even the door, should it be greater. This temperature should be observed two consecutive days. On the third day the temperature is raised to 66; on the fourth to 68; on the fifth to 70; on the sixth to 72; on the seventh to 75; eighth, 77; ninth, 79; and on the tenth, eleventh, and twelfth, to 81 degrees.

It is to be observed, that the earlier or later hatching of the worms depends not only on the heat of the stove, but also on the manner in which the seed has been kept during the course of the year. If it has been kept in a temperature rather warm, it will hatch sooner, and *vice versa.* When the time of hatching draws nigh, the seed should be stirred once a day with a spoon—not with the fingers.

When the eggs assume a whitish color, indicating that the worm is already formed within, pieces of white paper are placed upon them, pierced, that dust may not collect there. These pieces of paper should cover the whole box. Upon the paper should be placed small twigs of mulberry, having three or four tender leaves, and these should extend over the whole box. The worms, almost as soon as hatched, pass through the holes in the paper, and attach themselves to the leaves; the paper is then replaced by a fine net.

But few worms are hatched the first day, and being few, it is better to throw them away; but if it is wished to keep them, put them in a corner of the sheet, distinct from the others, which may be hatched on the subsequent days, and in order to make them equal with the last, on the two following days give them only half the quantity of leaves given to the others, as it is of much advantage to have the worms alike.

When the temperature of the apartment reaches 75 degrees, the atmosphere becomes too dry, as the hygrometer will indicate, and may injure their growth. Then place in the room two plates of water, of about four inches diameter, and the evaporation will temper the dryness. The room for the worms is supposed to be prepared.

When first hatched, they occupy but little space, and may be left where they were born until the third change, occupying as at first (the directions are understood to be given for five ounces of seed) an area of about four yards square; at the second change eight, and at the third nineteen. This being understood, gratings (made of reed in preference,) sufficient for this area, are placed in the room, and the corresponding numbers, written on slips of paper, are attached to them.

Whether the worms are kept in the room where they were hatched, or removed to another, the first day the thermometer should be at 75 degrees, for the heat should be diminished in proportion as the worm grows, and gathers strength.

If a cold unfavorable storm should retard the developement of the leaves of the mulberry, and make the cultivator apprehensive for the fate of his worms, the temperature should be diminished, and this will retard the hatchings; and if the worms are already hatched, will diminish their hunger. But it should not be reduced lower than 70, or 68 degrees, and the diminution should be made gradually.

When the newly hatched worms go out in great abundance, and a bubbling of the worms is seen, place twigs on paper with a number corresponding with that on the box, so that those hatched at the same time may be near each other. The twigs should not be taken up with the fingers, but with a hook, so as not to touch the worms. The twigs should be placed apart from each other, that there may be room for placing between them leaves finely cut, and the branches may be emptied of a portion of the worms, if they are too thickly crowded.

In order to have a proper distribution, divide each sheet of paper into four parts; and in this manner the worms produced from one ounce may be easily distributed on four sheets, which they should occupy till the first change. The remainder of the worms are distributed in the same manner; then a few tender leaves finely cut are given them, distributed so that by degrees the entire superficies of the sheet may be covered with worms.

All the worms are generally hatched in two, or perhaps three days; whence the first will be little larger than the second; and as it is of much importance to have them of the same size, it is necessary, at first, to give them (the first) less food, and to keep them in a place where they shall have less heat.

If the worms are carried from the chamber where they are hatched to another, no other precaution is necessary than to prevent their taking cold; but if they are carried to another house, it is necessary that every sheet of paper should contain all the worms of an ounce of eggs. The sheet being divided into four parts, the worms are easily distributed on four sheets; and if they are too thick in one part, it is easy to equalize them.

In transporting them, let them be well protected and covered, that nothing may touch them.

On the nourishment of the worms.

The leaves of the mulberry are the only food of the silkworm. These should not be given to the worms as soon as plucked, but should first be kept in a cool airy place five or six hours; neither should they be too dry and hard, particularly at first; they should never be given when wet; and if it has rained, they should be dried, either by placing them on a clean pavement of tiles, turning them, or let the water run off by placing them on a sheet folded in form of a bag. If necessary, they may be preserved two or three days, keeping them in a cool place and not much heaped together, stirring or moving them from time to time.

It is necessary to clip the leaves, taking away that which the worm does not eat, and the more carefully the smaller the worm. It is of less importance to do this after the fourth change. It is necessary to cut the leaves for the worms, that they may eat them the more easily.

Generally the leaves should be distributed to the worms four times a day, that is, every six hours. In this way they have time to digest, and always eat with appetite all the leaves you give them; and in this way the bed or residuum of the leaves is less, which, together with the excrement, corrupts the air, especially in the last changes. If, however, it is seen that they have a good appetite, or, for example, if they should eat in one hour all the leaves of one feed, then, at the expiration of *three* hours, an intermediate feed may be given them, consisting of half the usual quantity. As the appetite corresponds with the state of their health, and they eat less when near a change, or a little after they awake, attention should be paid to this in giving them leaves.

The changes have been spoken of. They change their skin, which does not grow in proportion to their body. It splits, and another succeeds. This change produces on the worms a kind of sickness, which first renders them weak, then drowsy, (and then it is said they sleep,) and they are weak when they awake. The greatest care should then be taken of them, especially to maintain the necessary degree of heat. The changes take place four times while they are on the grating, and twice in the cocoon.

Of the changes of the worm.

We will now proceeed to point out what should daily be done in the management of worms during the first four stages, or ages.

First age.

When the worms are carried to the place where they are to be fed until the first change, the temperature of the room should be 75 degrees. The leaves of large size may be given to them in proportion to their growth. The food, divided into four feeds, should consist of—

First day—2 lbs. of leaves very finely cut.

Second day—4 lbs.

Third day—8 lbs. If their appetite is great, give them an intermediate feed.

Fourth day—4½ lbs.: because, the change approaching, they eat less; the last feed less than the first.

Fifth day—1 lb.: to be distributed when it is wanted, as the greater part of the worms sleep.

Second age.

The temperature of the room should be from 72½ to 75 degrees. As at this age the worms produced from five ounces of eggs should occupy forty yards of grating, these should be prepared.

The worms awake successively, but leaves should not be given them until all are awake, in order to keep them equal; nor will the first suffer, even though they should have been twenty or thirty hours awake without eating. It is necessary to prepare six pounds of branches, and the same quantity of leaves, finely cut. If it is observed that many of them endeavor to leave their respective sheets, they should be removed, commencing where they are thickest.

Sixth day—Spreading gently the branches over the worms, let one branch be about a finger's length from another, and thus cover the entire paper. Put the branches which are covered with most worms on the tables, or baskets, for moving them. Place them on the new grating, 40 sheets of which, growing by degrees, they will, at the expiration of this change, completely occupy. If, after the removal, worms should still be found on the frame bed, let them be collected in the same manner. These directions will serve for all the removals at each subsequent change. The leaves of the branches will serve them for their first feed. After an hour or two, give them two pounds of leaves, distributing them in the interstices between the branches, that the worms may spread. They should not however be too much scattered; but should be collected with a brush. During the remainder of the day let the remaining feeds be given them.

The leaves of the first bed are collected and carried out of the room to be cleaned and dried.

Seventh day—Twenty pounds of leaves are necessary for the four feeds, given every six hours. The first being less, and the two last consisting of a larger quantity, continue to enlarge and regulate the divisions of the grating.

Third age.

Eighth day—Twenty-two pounds of leaves should be supplied. The two first feeds should be abundant; the last scanty, as the worms begin to become drowsy.

Ninth day—Six pounds of leaves are sufficient, to be scattered lightly, as required, as many will now be asleep.

Tenth day—Ten pounds of branches, and a like quantity of leaves, are sufficient: and it is necessary to prepare ninety-five square yards of grating. The thermometer should be from 70 to 72½ degrees. When the worms are awake, by means of branches and drawers they should be carried to the new gratings. When they have eaten the leaves of the branches, give them for their second feed five pounds of leaves: and for the last, the remaining five pounds. The leaves of the old bed should be carried out of the room, and the worms which have awaked late collected and placed near the stove, and fed with more leaves, to equal them to the others.

Eleventh day—They will consume this day sixty pounds of leaves. The last feed should be more abundant than the first, as the appetite of the worms is on the increase.

Twelfth day—They require sixty-five pounds of leaves, and the first feed should be more abundant than the last; as the change is approaching their appetite diminishes.

Thirteenth day—Thirty-five pounds of leaves are sufficient, many worms being already drowsy; and the leaves should be given to those only which continue to eat.

Fourteenth day—Eighteen pounds of leaves are sufficient to be distributed as wanted. The worms are preparing for the third change, and require every attention, that the temperature of the room be not changed; not to make the ventilation too great, or change the air by opening the ventilators; and if the weather be moist, or oppressive, it is necessary to light a blazing fire of straw, chips, &c.

Fifteenth day—Almost all the worms are asleep, and leaves should be given only to the few not yet drowsy; and should some be already awake, they should be made to fast, to make them equal to the others: no fear of their suffering for it. If the worms have hitherto been left in the chamber where they were hatched, it is now time to remove them to the room where the cocoon is to be formed. It is necessary to prepare for the fourth change, which now requires two hundred and twenty-five yards of grating. The thermometer should be from 68 to 72½ degrees. But if, on account of the heat of the room, it should be higher, it will not be injurious, provided the air be not stagnant or close, which is prevented by opening the ventilator and door, if necessary; lighting a fire in the chimney or ventilating stove.

Fourth age.

Sixteenth day—When all or nearly all the worms are awake, there should be ready 25 branches and 40 pounds of leaves, cut large. The removal is made in the customary way to the new gratings. As soon as the worms have eaten the leaves from the branches, two good feeds are given them, dividing unequally the 40 pounds of leaves, the second portion being the larger. They then distribute themselves on the grating. The worms which awake last are put on a separate grating.

Seventeenth day—110 pounds of leaves are required to be given them; a scanty feed the two first times, and the last more abundant.

Eighteenth day—150 pounds of leaves are required. The two last feeds to be more abundant, as the appetite is on the increase.

Nineteenth day—They will consume 170 pounds of leaves; and as the time of change again approaches, the first two feeds should be more abundant.

Twentieth day—They require 85 pounds of leaves in smaller portions, as the greater part of the worms are asleep.

Twenty-first day—20 pounds suffice, to be distributed as wanted: almost all being drowsy.

Twenty-second day—They complete the fourth change, and awake. In the course of this age it is frequently necessary to change the air, especially if there is a noisome and suffocating smell, and if the hygrometer indicates moisture. If it is not cold or windy, the windows may also be opened. The degree of heat should not, however, be diminished. Use may be made of the apparatus for purifying the air.

Fifth age.

The care of the worms in the fifth age, that is, after the fourth change, is the most important and most difficult; because they are, much more than in the preceding stages, subject to disease from the following causes. 1st, the moisture arising, as well from the worms themselves as from the leaves. 2d, the moisture of the atmosphere, and particularly when stagnant or confined. 3d, the unwholesome exhalation from the excrement of the worms and the putrefaction of the leaves. 4th, keeping the worms too crowded on the gratings, by which their respiration is impeded or rendered more difficult. It is important to know these causes of evil, in order to prevent it before it takes place.

The moisture is ascertained by the hygrometer. It is remedied by opening the ventilators and burning in the chimney chips of wood and dry straw; and if the external air is neither cold nor moist (which may be ascertained by placing the thermometer and hygrometer in the open air,) by opening the doors and windows, the hygrometer will show when the moisture is dissipated; the unwholesome exhalations are known by the stench. It is the vulgar opinion that this may be remedied by burning odoriferous substances, or by evaporation of vinegar; which, however corrupt, still move the air. These bad odors, which are mixed with the atmospheric air, are destroyed by effluvia of the gas produced by the bottles as previously described. These should be carried around, that the vapor may be spread in all parts of the room. The operation to be repeated when necessary. We have already spoken of the necessity of giving the worms the leaves free from wet, and of the mode of drying them; let us now proceed to the daily instructions.

In this fifth stage the worms produced from five ounces of seed will consume about 3360 pounds of leaves, and will occupy, gradually extending themselves, 500 square yards of grating.

Twenty-third day—For this day are required 60 pounds of branches and 30 pounds of leaves. The worms are removed by means of the branches and the drawers or tables to the new gratings. The leaves are divided into two feeds, and in the distribution the cultivator is to be governed by the appetite of the worms. If any of the worms awake late, they are to be collected and put in a warm place with more food.

Twenty-fourth day—180 pounds of leaves are necessary, divided into four feeds. For the first, 25 pounds are sufficient, to be increased so that the last may be 65 pounds.

Twenty-fifth day—280 pounds should be prepared. For the first feed 65 pounds, and for the last 80 pounds. The worms now would eat more, but it is necessary to leave them time to digest the leaves that have been given them.

Twenty-sixth day—360 pounds are requisite: 80 pounds in the first feed, to be successively increased.

Twenty-seventh day—540 pounds are wanted. The first feed 100 pounds, the fourth feed 140 pounds. But if, in one hour, they eat all the leaves of one feed, give them an intermediate one. Their wants, more than any thing else, should regulate the quantity.

During this and the following day, it is necessary to change the beds. Not having new gratings, the branches loaded with worms are placed on the tables, so as to free a part from the grating, from which they are taken in the customary mode, the sheets of paper with the bed. New papers are substituted, on which are placed the leaves with the worms, care being taken not to bruise them. In this way, by degrees, all the grates are cleaned, employing the time and number of persons necessary.

Twenty-eighth day—The worms now eat ravenously, so that they require 650 pounds of leaves, to be given them in four or five feeds, and, if required, give them intermediate feeds.

Twenty-ninth day—They require 600 pounds of leaves, and the first repast should be more abundant than the others, as the appetite in some begins to diminish. Intermediate feeds to be given when necessary.

Thirtieth day—The appetite is less, and 440 pounds are sufficient, divided into four repasts, the first of which will be the most abundant, and the last the most scanty. For the last feeds the leaves of the old plants should be preserved. This day the second cleansing of the gratings takes place in the manner previously directed. On this occasion, the flame to change the air will be necessary, as well as to go round the room with the vapor-producing bottels for purifying the air. Attention must also be given to the hygrometer and thermometer, to temper the moisture and the coolness of the atmosphere.

Thirty-first day—Only 330 pounds are required, to be distributed as wanted, as many of the worms eat no more, or eat little. Continue to clean the gratings, as it is very necessary for the worms to respire a pure and wholesome air, therefore the ventilator should be kept open, and the vapor should be used.

Thirty-second day—The worms give signs of complete maturity.

These signs are: 1st, when they mount upon the leaves given them and do not eat; 2d, when they keep erect the upper part of the body, which, seen against the light, appears transparent and of a yellowish white; 3d, when they go toward the sides and mount them, showing a disposition to go elsewhere; 4th, when the wings of the bodies contract, and they have changed the greenish color of their bodies into a golden yellow; 5th, when the skin of their neck is much shrunk; 6th, when the body becomes more soft, like paste; 7th, when taken in the hand and seen against the light, they have, as it were, a greenish yellow transparency, or the color of a yellowish white grape perfectly ripe.

Seeing in worms these signs, it is necessary to prepare the brushwood. In the mean time it is necessary to nourish those which still eat.

Of the brushwood, and the mode of placing the worms upon it.

The manner of preparing the brush, upon which the silk worms form their cocoons, is sufficiently known. It should be made so that the worm may easily climb upon it, and place itself between three or four slight twigs, to which it may attach its threads, so that they should not be too thick, nor too wide apart. If they be too thick, they prevent the necessary ventilation, and often produce double cocoons, in which two worms are enclosed, and which are of less value than the others. Let the brush be placed on the gratings, and not upon the papers, so these may be changed when necessary to clean. Let this be done as before mentioned. When many worms are seen to mount, it is proper to place the brush near the mature worms; but there is no harm if there should be some delay, as in the mean time they discharge the excrement. At this time it is well to admit the external air, provided there be no wind, and the thermometer not lower than 68 degrees. The worms should not accumulate on one part of the brush; which is prevented by laying other branches near where they collect. If some of the weak, dull worms remain on the gratings, and some from weakness fall from the brushwood, they should be gently taken up and put upon the table and carried to another chamber, where the temperature is about $72\frac{1}{2}$ degrees, and slightly ventilated. Those which will not eat more should be carried to the brush upon a branch horizontally placed, if there is danger of their falling through weakness. When all the worms are upon the brush, let all the gratings be cleaned, the papers removed, and the chamber well cleaned, for which purpose all the means pointed out should be used, to have the air warm, pure, and well ventilated, but no wind should be allowed to enter, which would be fatal to the worms at work.

It is also important that the air be not too warm and dry, as the worms will not produce so fine silk. The worms managed in this way complete the cocoon on the seventh day from that in which they commenced mounting the brush; but it will be well to wait till the eighth or ninth before collecting them. Strip the brush regularly, commencing at the lowest part; but in collecting the cocoons, never press them together where they may be crushed; and if they are not yet finished, do not mix them, and thus injure the others.

Of the worms destined to make seed.

It is proper to give some instructions respecting the seed to be collected for the following year, as it is very useful to provide the seed at home with due care rather than purchase it; and it is an erroneous supposition that it should be changed, unless, owing to bad management or other circumstances, the worms remaining weak have formed bad cocoons. If it is wished to make a similar quantity of seed to that used (5 ounces,) a sixteenth part of the cocoons collected is required. The cocoons to be selected for this purpose should be of pale straw color, of fine silk, and hard, particularly at the extremities, and a contracted circle in the middle. The largest should not be chosen. The male cocoons are not easily distinguished from the female, but it is generally observed that the former are more pointed and smaller, those of the females rounder and larger; although these signs cannot be entirely relied upon, it is proper, according to them, to separate the two sexes. Let the cocoons thus selected be kept in a dry room, at a heat of 66 to 72½ degrees, spread on gratings covered with blotting paper, in layers not more than three fingers deep.

At the expiration of 15 days, the grubs commence coming forth, and a farther space of 15 days will elapse before all are produced. The warmer the room, the sooner will they come forth. This room should be darkened, or have but little light. Soon after they have left the room, the different sexes meet and copulate; and this they they soon do, if the males are carried near the females, which is effected by taking them gently by the wings. As soon as this is finished, they must be placed on a linen cloth stretched on a frame prepared for this purpose.

They should be kept as much as possible in the dark, for in the light the moths weaken themselves by constant flapping of the wings. The cocoon from which the grub has issued must be removed, that it may not be in the way of those that have yet to come forth. If more of one sex come out than of the other, those that are over should be put in a box, and kept in the dark, to be copulated as soon as there are others to be put with them. If the number of males exceeds that of females, the excess may be thrown away; if the females exceed, they should be kept to be joined with males which have been connected with another. The male and female should not be left in connection more than six hours. They may be separated by taking both by the wings; or even by the bodies. The males should be kept in a box, to be used if there should be an excess of females. The females are then to be carried into a well ventilated room, but almost dark, and placed upon linnen cloth stretched upon the floor. A square yard of cloth can contain six or seven ounces of seed; as much as is generally produced from three pounds of cocoons. The grubs should be kept separate, so that one may not interfere with another. The females may be left upon the cloth 36 or 40 hours. All the pieces of cloth where the eggs have been deposited should be well dried, cool and loosely rolled up, and put in a dry place, where the heat should not be more than 65 degrees, and where in winter it does not freeze. It may be well to place them on a frame attached to the roof, to avoid mice, and to protect them from insects which may destroy them.

For the Farmers' Register.

OBSERVATIONS ON THE LOW WAGES OF FEMALE LABORERS.—No. 2

Since sending to the press the first part of these observations, there has been published a communication to the New York Farmer, on the same general subject, the greater part of which I shall here quote. From the initial letters signed to the piece, it appears to have been written by the Rev. Henry Colman of Massachusetts—and is therefore entitled to respect on account of its source, no less than its matter. The title of the piece is the "Value of female labor," and its general purport would seem to be, at first view, directly opposed to my opinions. But if fully considered, it will be seen that there is no opposition of views—and that the facts stated below only prove the great gain to female laborers and to the public, from opening to them many new employments.

"One of the most remarkable features in the present condition of this country is the high value of female labor. In foreign countries this labor has been comparatively very poorly paid; and in some it has been, and continues to be, of a servile and degraded character."———"In our cities, heretofore, women employed as seamstresses have been poorly paid, and have many times been so severely oppressed and abused by their extortionate employers, that they have been driven to desperation, and yielded to temptations which have ended in infamy and ruin. But women now, who are capable, and industrious, have their full share in the prosperity of the times.

In the country, in family service, where indeed a woman can be found willing to enter it, a capable, honest, and good domestic, may command almost any things he will demand—from one to two dollars per week. In cotton and woollen factories those who are diligent and capable earn, besides their board, from three to four, and in some extraordinary cases even five, dollars a week. The braiding of palm leaf hats is now carried on most extensively in several parts of the country, and many young women, living under their parent's roof, find no difficulty in earning two and three dollars per week. Great numbers of young women are employed as seamstresses in our large clothing establishments; as binders in our hat and shoe manufactories; as makers of shoe pegs in those establishments; as folders in our book-binderies; as compositors in our printing offices; as attendants upon the press in those offices where the printing is carried on either by water or steam; as bottomers or weavers in our chair manufactories; in various operations in our comb-making establishments; in our twine factories, as spinners; in some of our steel factories, as grinders and polishers; in our segar establishments, as rollers of tobacco; and in such a variety of other manufactures that it is quite impossible to enumerate them. In all these cases their compensation is liberal and ample.

This is altogeter a new spectacle in the condition of society; and one which the benevolent mind will contemplate with pleasure. It must be allowed that many of these occupations are pursued at the expense of that household education, which is indispensable to qualify them to preside with skill and propriety over our domestic establishments, as wives and mothers; and we are not without serious apprehensions, in respect to the moral results of congregating young persons of both sexes in great numbers in any situation, especially where they are withdrawn from the inspection of parental solicitude, and all the favorable influences of domestic life. But we will hope the best. In every human condition there is a mixture of advantages and evils. We will hope that the advancing education of the community will do all that we have reason to expect from it, in saving us from the bitter and degrading experience of older countries. We know that in many of our manufacturing establishments, under the direction of the intelligent and high minded men who have the charge of them, the most scrupulous and commendable attention is paid to the preservation of good morals, and the general improvement of the condition of society. May those who hold stations so responsible, and exert an influence so commanding and important, use it for good; and never lose sight of their high obligations. For ourselves, we believe that much of the intellectual and moral degradation, which has marked any portion of the female sex, in any part of the world, (and we would not be forgetful of the eminent and preponderating virtue, which has in such a majority of cases raised them above all the disadvantages of their condition,) is to be directly ascribed to the condition of extreme dependence in which they have been placed. Whatever increases the value of their labor, raises them above this dependence; begets a spirit of self-reliance and self-respect; inspires a sense of the value of character; and kindles a zeal for improvement. All this is is favorable, both as the security and promoter of virtue; all this will essentially contribute to elevate the moral and intellectual character of women; they will cease to be regarded merely as the creatures of man's pleasures, and the slaves of his caprice; and assume the proper dignity of an equal partnership in all his concerns, trials, cares, and duties; and they will rise to that condition in which God designed and Christianity tends to place them, not at the feet, but at the side of man."

The cause of the prosperous condition, above described, of female laborers, and of public benefit derived from the products of the profitable employment of thousands who would otherwise have been eating the bread of dependence, or of charity—are sufficiently evident. Instead of all the female laborers of Massachusetts being confined, as in Virginia, to the exercise of a single mechanical business, they are employed in many, for which they are as well fitted as for using the needle—and consequently their condition is raised much nearer to that of male laborers. Still there is remaining a great difference—great disadvantages to females—and the greatest is the operation of the old prejudices which condemned women to idleness and dependence, or to profitless labor. Within the last few weeks another "strike" has taken place among the male laborers of Massachusetts, directed especially against this gratifying improvement in the condition of women. The male operatives in some branches of manufactures, exhibiting as much stupidity as of scoundrelism, have combined, and struck work, to compel their employers to dismiss from labor, and turn out to want and misery, all the females employed in the same branches of business. If successful, similar coercive measures will soon extend to all the other new employments mentioned in the foregoing extract—and the women of New England will be reduced to the exercise of one mechanical trade, and even in that (as now in Virginia) will have to yield to males all the highest profits. Yet these brutes and fools who have dared to publish such resolutions, would have their full share of helpless female connexions to provide for, and whom they would then have either to support, or to see supported by the public as paupers, rather than let them eat honest bread of their own earning.

The piece copied above, and the recent public proceedings on the same subject, have drawn me to remark on a state of female society, and condition of employment, very different from what exist in Virginia. It is not my design to give the preference to the former over the latter. Each is better in some respects, and worse in others—and while I may applaud what is commendable, and condemn what is improper, in both, it is not intended to compare the condition of laboring females in New England and Virginia, or to estimate the comparative advantages and disadvantages. It is proper however, to remark, that the demand for domestic servants in New England, and for laborers in large factories, furnish considerable employments for females, which have almost no existence in the south. But in all trades requiring skill, and delicacy of touch, more than heavy labor, and many of which are carried on here, there is no reason, except our customs and prejudices, why women should not be given their fair share of employment and profit. We have as yet but few cotton factories, and unless put under very different regulations from any yet known, these establishments can scarcely be counted on as serving to increase the comforts, and elevate or maintain the respectability, of female laborers. It is true they furnish employment to many—but the system (as heretofore in operation) requires (or at least permits) a promiscuous assemblage, without separation on account of difference of age, of sex, or of previous character. I do not mean to say that these objections might not be obviated by an entire and radical change of the usual system of factory operations. But until such reformation is made, labor in cotton factories, though it may give bread to suffering females, will not leave to them untainted reputations. A young female may be as virtuous, as discreet, in every respect as deserving, while a laborer in a cotton factory, as in any other situation: but she would not be so considered by public opinion, and therefore this kind of labor (as now carried on) offers no resource to those females who cherish a spotless reputation above all earthly gain. Unfortunately, in the commencement of such establishments the grade of character of female operatives will be still lower than afterwards: and even in New England, the mere circumstance of having been employed in a factory, always militates against the character of an unknown female, when afterwards seeking other employment.

Dismissing then from present consideration, cotton factories as means for benefiting female laborers, (though with the earnest hope that the objections to them may be removed—) let us see whether other means may not be found to greatly diminish, if not entirely remove, the existing and enormous evils which have been noticed. In the hints or suggestions which have been, or may be offered, it is considered quite as important to maintain and to elevate the character of laboring females, as it is to furnish them with employment, and honestly earned bread. Women must continue a degraded part of the human race, until they are permitted to share fairly and equally in the profits of such labor as their sex does not prohibit their performing. Without this reformation, (which is more or less wanting in every region of the globe,) women will remain dependent, suffering, and even degraded beings, in a far greater degree than their nature makes necessary: and whether as the objects of the adoration of civilized and refined man—or slavish drudgery in savage life—of luxury and sensuality in Asiatic harems—or of passive suffering and of living martyrdom, as is so often the case in our own country, as well as every where else—in all these cases women are not permitted to exercise any profitable faculties, and (in a politico-economical view) are more or less expensive burdens on the hands of the short-sighted and selfish oppressor, *man*. The exalted estimation of women entertained in many cases, serve to reach the same ultimate result, as the stupid and cruel jealousy of the "trades unions," which denounce the interference and competition of female laborers. Fathers, brothers, and husbands, would use every painful personal exertion, and submit to the extremes of privation, to avoid subjecting to the necessity of mechanical labor, the beloved females with whom they were connected—forgetting that the death of their protectors, or other misfortunes of probable occurrence, would in consequence, throw them, in so much a more helpless condition, upon the cold charities of the world.

It is not only their interests that I seek to maintain—but the "*rights of women*," though not in the sense of their advocate, Miss Wolstoncroft. It is their indisputable and precious *right* to exercise the talents and faculties with which they are endowed, for their maintenance, for their happiness, for their respectability and true dignity of character—and this is denied them, in a greater or a less degree, by the prejudices, the customs and the institutions of society.

POLECON.

USE OF THE TETHER. CHOICE OF SEED WHEAT.

To the Editor of the Farmers' Register.

Bethdagon, (King William,) Aug. 1835.

My first impressions on entering upon a farming life, were extracted from Arator. Plough deep and raise grass—this I have ever kept in view. To accomplish the raising of grass, and thereby justify deep ploughing, I was necessarily compelled to dispense with grazing—and the more effectually to prevent my doing so, I suffered no cross fencing to remain, lest the temptation should overcome my determination. I kept but few cattle, and soon found the scanty pickings of a poor highway would leave me *cattleless*. For the last four years I have been so benefited by the *tether*, that I am induced through the medium of your journal to recommend its use to farmers generally. Horses, mules, oxen, and cows, can be moved about with little trouble, and but little injury to the land. The three-shift system, with tether grazing, aided by marl, clover, plaster, and deep ploughing, would, with our atmosphere, cause even the deserts of Arabia to bloom. The implement is simple in its structure. It consists of a pole 10 feet long, which is attached to a similar one 8 feet long, by a chain of 5 stout links, the middle link having a swivel, such as is common in trace chains. At the end of each pole is a piece of iron, in the form of a loop, embracing 2 sides of the pole, and projecting a little beyond the end, in which a link of each end of the chain is fixed. At the other end of the long pole is attached a ring 2 inches in diameter, by a similar loop. This end is staked down, the ring allowing it freely to run around the stake. At the end of the 8 feet pole is attached a smaller ring with a similar loop, to which the halter is tied until horses become accustomed to it. The halter should be what is called a nose halter. After a time a collar around the neck will answer. Thus situated, a horse will go over a space of 40 feet diameter, without danger of being either entangled, or breaking away. For a cow, a rope should be put around the horns, to which tie the tether—to which place the milk maid may repair, and after milking, change her situation. But the principal advantage I think I have derived from an experiment tried this ploughing season. Two horses and two mules were, during the principal season, alternately ploughed; those not engaged were constantly kept to the tether on clover; and at night, all. The result was, that the mules, without corn, kept in good order—and the horses each with four ears of corn once in 24 hours. The ploughing I considered as equal to what I had usually performed by three ploughs in the usual way—the labor of one ploughman being saved, and much corn, no small item during that season.

Various are the opinions as it respects the best kind of wheat, but I believe generally it is considered that the purple straw is much superior to the bearded. Many farmers consider the purple straw so much more productive, that if they only make a full crop once in three years, yet it is to be preferred to the bearded, notwithstanding it (the bearded) is allowed to be much more uniform as to product. This season I have made some comparisons which to me seem conclusively in favor of the bearded. The great object being to obtain from a given space of land the greatest product, I selected of each kind under circumstances as nearly similar as could be, and carefully rubbed out. The results were as follows:

Twelve heads of purple straw wheat, and twelve of bearded, being placed in opposite scales, the bearded weighed the most by 46 grains.

Ten heads of very superior purple straw, weighed - - -	242 grs.
Ten heads of very superior bearded,	261
Twelve heads ordinary purple straw,	196
Twelve heads ordinary bearded, -	209

In every instance there were many faulty grains in the purple straw, which although they would have passed through the sieve (in fanning) were carefully weighed. This would be fair to deduct. My impression is, that the reason purple straw is considered so much more desirable than bearded wheat, arises mostly from the fact that a bushel of it will weigh more than a similar measure of the bearded, the grain being of a different form, and generally smaller, more of them will be in a given measure. But to estimate by the acre of land, the result will be in favor of the bearded; and as it is reasonable to suppose as many heads of the one as the other may be raised on the same surface, the conclusion upon my mind is, that the bearded should be preferred, particularly when we take into consideration that it is more uniform in product, less liable to rust, and will attain, on thin land, a greater height.

WM. B. WESTMORE.

[The comparison of the product in grains of a certain number of heads of wheat, or of the weight of a certain number of grains, furnishes a very insufficient test of the difference of general productiveness of two kinds. The grains of the (mountain) purple straw, (spoken of above) are certainly smaller than other kinds, and the heads may also contain fewer grains—and yet, the stalks standing more thickly, or there being many more heads of wheat on an equal space, might more than compensate for the smaller product of each head. We have long been of opinion, that in every other kind of grain as well as wheat, the product of the separate ears, or the size and form of the separate grains, are of much less importance to the amount of the crop, than many other things scarcely taken into consideration. We hold that the kind of corn, or wheat, which is most suitable to the farmer's soil, climate, and other circumstances—or which is best able to resist the particular evils and disadvantages to which the growth will be most usually exposed, will bring the best average crops—without regard to the size of the ears, or size or shape of the grain. Indeed, when ears of corn, wheat, or other grain, are remarkably large (for the particular kind,) and the product is very great to each stalk, it furnishes evidence of insufficient product from the land—or in other words, that a greater number of stalks would have yielded a better crop, though by reducing the product of each one.

Every different kind of wheat has some one or more peculiar advantage, and also some disadvantage of perhaps equal weight, or liability to danger and loss, under certain circumstances. In years when all causes of such losses happen to be escaped (which is very rare,) one kind of wheat perhaps will yield as well as any other—or by its greater value in some respects, will compensate for any deficiency of value in others.

We prefer the mountain purple straw to any other kind of wheat, and sow of it altogether; not on account of its being considered more productive, but because its peculiar disadvantages may be obviated by using proper care, and it will better withstand the dangers which no care can guard against. Its great advantage consists in the ripe grain being able to bear more exposure to wet weather, than any white, or bearded red wheat: and where we make large crops, our wheat is exposed in the field from the beginning of reaping, to the end of thrashing. Besides this important ground for preference, this kind of wheat is heavier than the bearded, and makes better flour. Indeed, for yielding flour, it is said by some of the most experienced millers to be inferior to no other kind—though the flour of white wheat sells better, merely because it is of a purer white. In this respect, fashion exerts great sway—and the best flour will not command the best price, unless it is free from the slightest tinge of the color which the skin of red wheat gives. The smaller sized grain of the purple straw wheat, is of itself, a gain to the farmer, as making a less measure of seed necessary—but is attended with the disadvantage of being more difficult to separate from the seeds of weeds, by fanning and screening, than larger grained wheats. This last is indeed the greatest objection to the purple straw. It is also much more subject to smut than bearded wheat: but though this is perhaps the worst of all the diseases of wheat, when unchecked, it is the one which may with most certainty be prevented by washing, brining and liming the seed.

A neighbor of ours, who is a farmer of good judgement, thinks that his golden chaff wheat this year has only brought half as much as purple straw, on adjoining and similar land—and therefore has determined to abandon the former, and sow the latter kind altogether. But though, for some particular reason, there may have been that degree of superiority this year, and in that situation, we think that his ground for preferring the one kind, is not less erroneous than that of our correspondent for preferring the other.]

For the Farmers' Register.

WHITE WASHINGTON WHEAT.

A correspondent in the last number of the Register, requests a description of the White Washton wheat. As I am largely a debtor to the Register, for much useful information, and morally and politically interested in the improvements of agriculture, I desire to contribute my mite, however small, to its advancement.

The White Washington wheat has been long grown in this part of the country, and I have learned by tradition, that it was brought here from Mount Vernon, soon after the Revolutionary war. It was the approved crop in this region, until about the year 1798, when the Hessian fly, that terrible scourge, made its appearance. Among other schemes to arrest its desolation, new seed wheat was resorted to. In many instances, the result was favorable, and the crops better; but I think it is now generally admitted, that it was the change, and not the quality of the seed, which produced the good effect. After a few years' growth, in the same soil, the new wheats, with the exception of the Lawler, are found equally obnoxious to the ravages of the fly. I believe the best security against this pernicious insect, is to be found in the improvement of the soil, and good husbandry. The last winter was uncommonly severe, and we have not had so heavy a visitation of the Hessian fly since 1817. Notwithstanding these disasters, from a well improved field of forty acres, I have cut fourteen and a half bushels to the acre, and from another field of the same size, (though something has been done for its improvement,) I do not think I shall find upon thrashing, more than five bushels to the acre.

The White Washington is a smooth wheat, the straw a pale yellow, the husk thin, and when the grain comes to perfection, is very white. In good condition in the Baltimore market it will command from six to twelve cents more than common wheat. It is sought for by the millers, for family flour.

This wheat grows to perfection only in the salt water districts. Some of my friends in the interior, have got seed from me, but it soon degenerates, both in color and quality. The reason I cannot assign, but the fact is incontrovertible. I should think there is much land in lower Virginia, to which this wheat is well adapted. Since I have been a farmer, I have tried many kinds, but have settled down upon the White Washington, and the red chaff bearded. The latter is a hardy plant, and suits for late sowing.

Your correspondent complains of being deceived and disappointed in a barrel of wheat purchased in Baltimore, for the White Washington wheat. Some of our farmers here, have sustained loss and disappointment from wheat purchased in the Baltimore market, said to be from Virginia, which has proved to be of a different character, and in some instances, so damaged, as to affect its germination. I have heard from intelligent farmers, that if wheat has been much heated in the hold of a vessel, it is hazardous to use it for seed. I have proved by my own experience, the great advantages of changing my seed wheat, but I have never thought it safe to sow wheat purchased in the Baltimore market. It is to be lamented that there is so little agricultural intercourse between the states. We here know much of your politicians, but little of your agriculturists. If a few gentlemen of known probity, and carefulness, in your state, and ours, would raise wheat which they would recommend for seed, it would produce mutual advantage—and if one-tenth part of the time and intellect devoted to party squabbles, and the small schemes of ambition, were applied to agricultural inquiry, it would conduce more to the public good. In a body of farmers, high in intellect, and high in fortunes, the republic will find its best security, though I do not entirely concur in Swift's apothegm, which you have taken as your motto. I think that Locke and Bacon rendered more essential service to their country than Young, and Davy; and I cannot in our country, consent to place Mr. Bordley, and Judge Peters, before General Hamilton and Mr. Jefferson.

An inquiry has been made in the Register for the best thrashing machine. On this subject there will be much difference of opinion. I have been thrashing this summer with Cooley's, but have not finished. The time has been kept by my overseer, and I believe accurately. I have thrashed out twelve hundred bushels, at the rate of twenty-nine bushels per hour. I have been using Mr. Nicol's improved wheat fan. I find it will separate from the chaff more than one hundred and fifty bushels per hour. Mr. Nicols separated more than two hundred. The difference is found in his having a *separator* to his machine—and no straw remains in the wheat. Modern improvements have been highly beneficial; and if the mowing machine shall answer, agriculture, though not "in the full tide," may be said to be on the flood "of successful experiment."

I reprobate flattery—the mean and abject spirit that offers, and the morbid appetite which delights in it. Our politicians have become gluttons of praise; and "he who praises the highest, pleases the most." When I see the idolatrous adulation bestowed on mere partizans, such as would have made the cheek of Washington tingle with disgust, in solemn sadness I detect myself comparing the present, with the falling days of the Roman republic. But benefits may be acknowledged without degradation, or offending modesty.

I have for some years past ceased to sow wheat among my corn. The drag-log not only pulverizes my fallows finely, but being run before the plough, crushes the clover, and the weeds, and enables me to prepare the ground better, and with more expedition; and I hope you will not except when I say the drag-log which I am using, by the recommendation of the Register, is more than paying three years subscription.*

Eastern Shore, Md. Aug. 26, 1835.

IRISH POTATO TUBERS GROWING ABOVE THE SURFACE OF THE GROUND.

To the Editor of the Farmers' Register.

Orange, Sept. 10, 1835.

I am induced to write to you for the purpose of mentioning a fact, which struck me as being somewhat remarkable; it is this: when about to gather my crop of Irish potatoes this fall, I perceived that on a number of vines there were several small potatoes, of different sizes, from an English pea to that of a walnut, which induced me to examine further, when I found one on which, I think, I found seven and twenty growing, from an inch to at least 12 inches from the ground. This land is the spot on which our entire crop of straw has been stacked for 12 or 15 years. This fact you can publish if you choose.

QUINTUS BARBOUR.

For the Farmers' Register.

COMMERCIAL REPORT.

The cotton markets of the United States have been dull during the present month, owing to discouraging advices from England and France. Some decline has taken place, and the present quotation in Petersburg is 16 to 17½ cents. One bale of new cotton was sent to that market on the 23rd of September, by the same industrious planter who has annually exhibited the first bale—in 1833 and 1834, at the close of August. This is some indication that the crop is a month later than usual. The gathering of it is not yet commenced, unless on a very small scale, and indeed, little of it is yet matured. The weather has been very cool, and several slight frosts have occurred. It is therefore apprehended that the crop in Virginia will be seriously injured.

The ripening of the tobacco crop has been prevented by the same cause, and although the product may be large, the quality it is thought will be inferior. The price of this article has been well supported during the present month, and $6 to $11 embrace all but extreme prices. The receipts and shipments of tobacco and cotton for the year, (say to the 1st of October,) will be ascertained in the course of a few days.

The spirit of competition (founded on no appa-

*See description of the drag-log, p. 757, Vol. II. Farm. Reg.

rent cause) has advanced the price of wheat in Richmond and Petersburg beyond that of any other market in the United States. From $1.15 at the commencement of September, it has reached $1.30 and even $1.35 for choice quality, whilst in Philadelphia and New York $1.25 is the current rate. The price of flour has not kept pace with that of wheat. Other than City Mills is quoted at $5 75 to $6. The impression that the crop is greatly deficient gains strength as the season advances.

A momentary pressure for money lately prevailed in the northern cities, but it appears to be no longer felt. The United States' Bank is gradually closing its various offices, and has in many instances, made arrangements to transfer to State Institutions, the debts due at its branches, which course will tend to prevent any commotion in the money market—a result which has been seriously apprehended from the withdrawal of so large a capital.

Exchange on England 9 per cent. premium.

X.

September 25.

From the Globe.

RAILWAY FROM NEW ORLEANS TO NASHVILLE.

By our advertising columns it will be seen that the magnificent undertaking, the New Orleans and Nashville Rail Road, is to be commenced immediately, the first *fifty miles* being advertised for contract.

The length of the road is 565¾ miles, estimated to cost $10,063,946, including the machinery, depots, water stations, &c.

This estimate is predicated upon a graduation not exceeding ten feet rise per mile towards New Orleans; or twenty feet from it. There will be no curvature less than five thousand feet radius. The rails will weigh not less than forty-five lbs. per yard.

We learn that its projectors have determined to make it one of the most perfect works that the present state of science and art will admit. When completed, the time between Nashville and New Orleans will not exceed thirty-six hours.

This, by facilitating the mails and transit of passengers, will render it, in a commercial point of view, the most important improvement ever projected, and in case of invasion, the south may have a more prompt resource in the western militia—as cantonments in the vicinity of Nashville, where the abundance of provision and health of the climate are equal to any in the world, can be made for the rendezvous of the Western Army, and when required, transferred to the coast at a single day's notice.

Mr. Ramney, the Chief Engineer, is now on his way to Europe, with a view to make contracts for the delivery of iron, and the examination of the machinery and roads now in use or progress there.

Should the Virginians determine to connect their contemplated James River Improvement with this work, we may expect to travel from Washington to New Orleans in four days, with an ease and comfort never before contemplated.

EDITORIAL NOTICES.

The first volume of the Farmers' Register is no longer for sale, the first edition (of 1500 copies) having been exhausted. A second edition of the first volume will be printed if there should be sufficient demand. A subscription list is opened for this purpose, on which has been placed the names of those persons whose orders for the first volume have been received since the last copies were sold. All persons who may desire to obtain it, are requested to send in their names to the editor. Subscriptions for 5 copies, entered at once, and under a single name, will be discharged by paying $20. For single copies $5.

Nos. 10, 11, 12 of Vol. I. may be obtained at the subscription price, if desired, an increased impression having been commenced with No. 10. A few other and earlier odd Nos. of that volume may be had (by ordering as many as may be on hand,) at 25 cents each.

Vol. II. including the Supplement containing the Essay on Calcareous Manures, may be obtained from the publisher, or at the bookstore of J. W. Campbell, Petersburg, half bound for $5.50, and full bound in calf for $6. Without the supplement the price will be less by 50 cents, at which price the Supplement will be sold singly.

$2 a piece will be paid for a few copies of No. 8, Vol. I. if delivered uninjured, and free of postage.

For entire sets of the Nos. of Vol. I. uninjured, will be given in exchange copies of Vol. II, in half binding.

In reply to several good humored rebukes which we have received on account of the Nos. of the Farmers' Register not being trimmed at the tops, we have to say that the omission has not been caused by the trouble or expense of the operation—for neither is of much amount—but because that its execution would often so much retard the issue of many copies, as to make them a mail later. To include the latest notices, the closing sheet of each No. is put to press as late as the time of publication will permit, and after the copies are ready, every exertion is used to commit them to the mails as soon as possible. We shall attend to the wishes of our subscribers in this respect whenever it can be done without delaying the delivery—but shall still act on the supposition that each one will prefer to cut open a few sheets with a knife, rather than wait the time of another mail to receive the journal.

ANOTHER MULE'S COLT.

From a letter from J. T. Kilby, Esq. of Nansemond, received too late for insertion, we learn that his breeding mule has had another colt. It is hoped that it may live to decide whether this rare departure from the ordinary course of nature may be continued, or not, through a future progeny.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ON THE USE OF LIME AS MANURE.

By M. Puvis.

Translated for the Farmers' Register from the *Annales de l'Agriculture Française*, of 1835.

[Concluded from page 366.]

Various qualities of lime.

22. It is necessary for the farmer to know the nature of the lime which he uses. It may be pure, or mixed with silex, argil, or magnesia. *Pure lime* is the most economical, the most active, that which can produce the most effect in the least quantity.

Silicious limestone is used in greater quantity. The lime from it receives, as does the foregoing, the name of *hot lime*, and there is little difference in the application, except that more of the latter is wanting.

The *argillaceous lime* is the same as the hydraulic, lime or the *poor lime* of builders. It appears that the first two kinds are more favorable to forming grain, while the latter favors more the growth of straw, grasses, and leguminous crops. It is better for the improvement of the soil, but a heavier dose of it is required.

Magnesian lime acts very powerfully, but exhausts the soil if given in a large dose, or if it is not followed by alimentary manure in abundance. It has exhausted some districts in England, and entire provinces of America,* and it is to this kind that seem due most of the complaints made against lime.

By chemical processes the farmer may make himself sure of the nature of the lime which he uses.

Pure lime is commonly white, and is dissolved without any thing being left, in nitric or muriatic acid.

Silicious lime is often gray, and leaves a sandy residue [after solution,] which is rough to the touch.

Argillaceous lime is obtained from stones which have a clayey odor and appearance: it is commonly yellow—and leaves, after the solution, a residue which is mostly an impalpable powder, [*et qui prend en masse*,] which may be formed into a mass when wet.

Magnesian lime is made from stone commonly colored brown or pale yellow; it forms a white cloud in nitric acid, diluted with water, and used in less quantity than enough for saturation.

*The author has been deceived by exaggerated accounts of injury from liming in America. It is probable that wherever it occurred, it was caused by the usual ignorance of the action of lime: from erroneously considering it as an alimentary, and directly fertilizing manure, and after applying it, wearing out the soil by continued grain crops. Such effects are spoken of by Bordley. Ed. Farm. Reg.

Of second limings.

23. When the limed field returns to the state in which it was before the operation, when the same weeds re-appear, and the crops lower in product, it is time to renew the application of lime. It may be conceived that the time of the second liming depends on the amount given in the first. When the dressing has been light, it is necessary, as is done by the Flemings and the Manceaux, to recommence entirely, or to the extent of the first dressing: when it has been heavy, the next may be diminished by one-half. Besides, in this matter we should take counsel of the state of the soil, and of experience, because there are some lands which demand, and can use heavier doses of lime than others.

Quantities applied.

24. The quantities of first as of second dressings of lime, vary with the consistence of soils: they ought to be small on light and sandy soils—and may, without ill consequences, be heavy on clay soils.

The dose ought to vary according as the soil is more or less pervious to water, or as drained well or ill by its texture. Small applications to soils from which the superfluous water does not pass easily, are but little felt; but if the dressing is heavy, and the ploughing deep, the lime aids the draining, and adds to the healthy state of the soil. It may be conceived that the quantity of lime ought also to be increased with the annual quantity of rain that falls—because in proportion to that quantity ought the openness of the soil, and its fitness for draining, to be extended.

Nevertheless, the practices of the departments of the North, and of La Sarthe, seem to indicate the average dressing which suits in general for land: thus the liming of the North, which every ten or twelve years gives to the soil 40 hectolitres of lime to the hectare, or a little more than three hectolitres a year, agrees with that of La Sarthe, which gives eight or ten hectolitres every three years. The first plan gives at one dressing what the other distributes in four: as both make a like average, it may be thence inferred that the earth demands annually three hectolitres of lime to the hectare, [3¾ bushels to the acre,] to sustain its fecundity. But as neither the soil nor the plants consume all this quantity of lime, it is to be believed, that at the end of a greater or less length of time, the soil will have received enough to have no more need of it for a certain space of time.

Manner of treating limed lands.

25. After having by liming, given the soil a great productive power, having put it in condition to produce the most valuable crops, which are often also the most exhausting, it is necessary to husband these resources—to give manure in return for the products obtained—to employ as litter,

and not as food, the straw, now increased by one-half—to raise grass crops from the soil now fitted to bear them with advantage—in short, to modify the general plan, and the detail of the culture according to the new powers of the soil, the prices of commodities, and to local conveniencies.

However, it is not necessary to hurry the change of the rotation. Such an operation is long, difficult, very expensive, and ought not to be executed but with much deliberation.

Effects of lime on the soil.

26. The effects of lime, although similar to, are not identical with those produced by marl; and the qualities of soils limed, differ in some points from those of natural calcareous soils. The grain from limed land is rounder, firmer, gives less bran, and more flour, than that from marled land: the grain of marled land is more gray, gives more bran, and resembles that made upon clover, though it may be preferable to the latter. The grain of a limed soil is more like that from land improved with drawn ashes. Limed land is less exposed to danger from drought than marled land, on soils naturally calcareous. The crop is not subject to be lodged at flowering time, when the sowing was done in dry earth.

27. In limed earth, weeds and insects disappear. The earth, if too light, acquires stiffness, and is lightened if too clayey. The surface of the argilo-silicious soil, before close and whitish, is made friable, and becomes reddish, as if rotten: it hardens and splits with drought, and is dissolved by the rains which succeed. This spontaneous loosening of the soil facilitates greatly the labor of the cultivator, the movement of the roots of the growing plants, and the reciprocal action of the atmosphere upon the soil, which remains open to its influence.

All these new properties which the limed soil has acquired, doubtless explain in part the fertilizing means which calcareous agents bring to the soil: but we think it is still necessary to seek some of these causes elsewhere.

28. Lime, according to the recent discoveries of German chemists, seizes in the soil the soluble humus or humic acid, takes it from all other bases, and forms a compound but slightly soluble, which appears, under this form, eminently suitable to the wants of plants. But as this compound is not soluble in less than 2000 times its weight of water, while without the lime, the humus is soluble in a volume of water, less by one-half, it would follow that, in consequence of lime, the consumption of this substance, and the productive power of the soil would, in like proportion, be better preserved. Since the products of the soil increase much from the liming, while the humus is economized, since these products borrow very little from the soil, which remains more fertile while thus yielding greater products, it follows that the principal action of the lime consists, at first, in augmenting in the soil, and in the plants, the means of drawing from the atmosphere the vegetable principles which they find there, and next, in aiding, according to the need, the formation, in the soil or the plants, the substances which enter into the composition of plants, and which are not met with ready formed either in the atmosphere or in the soil.

The researches upon these various points are curious, important, interesting to practice as well as to science—and will lead us to explain, by means not yet appreciated, the action of lime upon vegetation.

Absorption by plants of the principles of the atmosphere, in the vegetation on uncultivated soils.

29. Saussure has concluded, from his experiments, that plants derive from the soil about one-twentieth of their substance; and the experiments of Van Helmont and of Boyle have proved that considerable vegetable products diminish very little the mass of the soil. But this fact is still better proved by the observation of what passes in uncultivated soils.

Woodland that is cut over in regular succession [*taillis*] produces almost indefinitely, without being exhausted, and even becoming richer, the mass of vegetable products which man gathers and removes, and of which the soil does not contain the principles. If, instead of woodland thus partially and successively cut over, we consider upon the same soil a succession of forests, and, for greater ease of estimation, resinous forests, we find, for the products of the generation of an age, forty to fifty thousand cubic feet to the hectare. This product is less than that of the resinous forests of many parts of the country, and yet it is nearly equal in bulk to half of the layer of the productive soil itself: it represents an annual increase of 24,000 weight of wood to the hectare—and which is produced not only without impoverishing, but even while enriching the soil, by an enormous quantity of the droppings and remains of all kinds.

These products which do not come from the soil, are then drawn from the atmosphere, in which plants gather them by means of particular organs designed for that use. These organs are the myriads of leaves which large vegetables bear—aerial roots, which gather these principles either ready formed in the air, or which take up there the elements, to combine them by means of vegetable power. But these aerial roots exert quite a different and superior energy in gathering the constituent principles of plants in the atmosphere, to that of the roots in the ground—since the former furnish nearly the whole amount of the vegetable mass, while the latter draw but very little from the soil.

30. Plants may well find in the atmosphere the greater part of the *volatile* principles which compose them—the carbon, hydrogen, oxygen, and azote. But it is not so easily seen whence they obtain the *fixed* principles of which their ashes are composed. These products could not exist ready formed in the soil—for the saline principles contained in the ashes of a generation of great trees, which would amount to more than 25,000 weight to the hectare, would have rendered the soil absolutely barren, since, according to the experiments of M. Lecoq of Clermont, the twentieth part of this quantity is enough to make a soil steril. We would find a similar result in accumulating the successive products of an acre of good meadow. It is then completely proved that the saline principles of plants do not exist ready formed in the soil. They are no more formed in the atmosphere, or the analyses of chemists would have found them there. However, as the

intimate composition of these substances is not yet perfectly known, their elements may exist in the atmosphere, or even in the soil, among the substances which compose them.

Neither can it be said that these salts may be derived from the atomic dust which floats in the air; for this dust is composed of fragments organic and inorganic, carried especially to the plants themselves, and then, in estimating this atomic matter at the most, we will scarcely find in it the hundredth part of the saline substances contained in the vegetable mass produced. We ought then to conclude that the saline substances of plants are formed by the powers of vegetation, or of the soil.

31. In like manner as with the saline principles, the lime and the phosphates of ashes ought to be due to the same forces, whether that the roots take up their unperceived elements in the soil, or that the leaves gather them in the atmosphere. This consequence results evidently from this fact—that plants grown in soils, of which the analysis shows neither lime nor phosphate, contain them notwithstanding in large proportion in their fixed principles—of which [or of the ashes] they often compose half the mass.*

Absorption of plants, in vegetation on cultivated soils.

32. Vegetation on uncultivated soils operates under conditions altogether different from those of the cultivated, so that the results receive modifications which it is important to examine.

Nature produces, and continues to produce, all the vegetable mass in spontaneous growth, without any other condition than the alternation and succession of the species. In vegetation on cultivated land, by bringing together the same individual plants which are to grow abundantly on a soil and in a climate which, in most cases, are not those which nature had designed, there are required, besides the general condition of alternation of the species, frequent tillage of the soil, and means to repair its losses, that the culture may be productive, and be continued. However, with these new conditions, the force of absorption of plants on the atmosphere still furnishes the greater part of the vegetable principles in soils not limed—and still more in limed soils.

To form a precise idea, we will take it in the land of the writer, its culture and its biennial rotation. As the same qualities of soil are found elsewhere, as no particular circumstance increases or impairs its products, there would be found similar results, for the same qualities of soil, with a different culture. The inferences which we will draw from ours, will apply then to all others.

On our soil of the third class, [or worst quality] fallow returns every two years, with a biennial manuring of 120 quintals to the hectare. This mass contains more than four-fifths of water, which should not be counted as manure, and consequently, the substance which serves for the reparation of the soil is reduced to 24 quintals. We reap, in rye, straw, and buckwheat, after the year of fallow, a dry weight of 40 to 50 quintals on an average. If it is supposed that all the manure is consumed, or employed in forming vegetable substance, still the soil would have furnished 18 to 20 quintals more than it received, and which excess would be due to the power of absorption, whether of the soil, or of the plants, on the atmosphere.

On lands of middle quality, which yield a crop every year, with a double manuring, that is to say, of 48 quintals of dry manure, in two years there is a product in wheat, maize, or potatoes, which amounts to from 12 to 15,000 weight, 120 to 150 quintals, of which two-thirds, or 80 quintals at least are derived from absorption.

On soils of good quality, with a manuring of one-third more than the last, which is equal to 64 quintals of the dry substance to the hectare, there are obtained of dry products, in grain, straw, roots, or hay, double of the last, or nearly so, of which three-fourths, or 180 quintals are due to the power of absorption.

Lastly—upon the most fertile soils, (*sols d'exception,*) where manures are useless, the product, often double, or at least half as much more than the last mentioned, will amount to 360 quintals to the hectare in two years. This product would be, as in spontaneous vegetation, entirely due to absorption.

We would have then, to represent the products of two years, in quintals, in the four classes of soil under consideration, the progressive amounts of 42,130,240,360: or, by deducting from these products the weight of the manure, we would have, to represent the power of absorption, the progression 18, 82, 176, 360 quintals. From this is deduced, as the first conclusion, that, supposing the plants have consumed and annihilated all the substance of the manure given, (which is beyond the truth,) plants receive a much greater part of their substance from the atmosphere, than from the soil; and that this power of drawing food from the atmosphere increases with the goodness of quality in soils.

33. The proportion of fixed substances, or ashes, in agricultural products, is 43 pounds to the 1000, and consequently, in our four classes of land, the quantity amounts to 180, 559, 1032, 1548 pounds. But the soluble saline substances form at least half of these ashes: they are then produced in the two years of the rotation, in the quantities of 90, 279, 516, 774 pounds. But, according to Kirwan, barn yard manure yields 2 per cent. of soluble salts: then the manure given to these soils contained 48, 96, lbs. 128 of saline substances, which being deducted from the preceding quantities, leave the four classes of soils stated, 42,183,388,774 lbs. of products in soluble salts, in two years of the rotation, gained solely by the absorbing forces of the soil and of plants.*

*This fact is explained very differently by the *Essay on Calcareous Manures* (Ch. VII) where it is used to sustain the doctrine of *neutral soils*. Ed.

*The proportions of ashes of different plants, and of their saline matters, vary greatly—and the uniform proportions assumed above, are far from correct, even as averages of unequal proportions. This will sufficiently appear from the following examples extracted from Saussure's table of the products of various vegetable substances. (See Davy's Agr. Chem. Lec. III.)

34. But, in the same soils, with the same manures and the same tillage, by the addition to the thickness of the ploughed layer of [illegible] thousandth part of lime, the products, [illegible] volatile or fixed, are increased in [illegible] the soil of the first named (or lowest) quality reaches the product of the [illegible] rises one-half or more—and that of the best (of the manured soils) increases a fourth. [illegible] scale of product becomes 12[illegible] and deducting the manure, 1[illegible] for the two years of the rotation. The most fertile soil (*sol d'exception*) cannot receive lime beneficially because it contains it already: these lands all belong to alluvions, where the calcareous principle has almost always been found in greater or less proportion.

35. The product of fixed principles [as ashes] in the three classes of limed soils, would be 559,868.1290 pounds, and in soluble salts, 278,430,645 pounds; and deducting the soluble salts of the manure, the quantities would be [illegible]. A light addition of lime has then doubled the force of absorption, and almost tripled the quantity of saline principles produced. One of the most remarkable effects of lime consists then, in making a soil produce a much greater proportion of saline principles: and if the experiments of M. Lecoq upon the efficacy of saline substances on vegetation are to be admitted, it would be [illegible] to the phenomenon of their production that lime would owe its fertilizing effect.

36. It results from what precedes, that [illegible] formed in the soil, or in vegetables [illegible] every day the nitrates of potash and of lime [illegible] under our eyes in the soil, or elsewhere, without any thing indicating to us the [illegible] which is contained. But potash [illegible] spontaneously in drawn ashes, according to the observations of the chemist Gellhen. We [illegible] salts also renewed in the artificial nitre beds, with the aid of moisture and exposure to the air. But it is the presence of lime that determines this formation more particularly. The nitrates abound in the ruins of demolished edifices: they are formed in the walls and in all parts of houses situated in damp places: they effloresce on the buildings of [illegible] in Champagne: they are produced spontaneously in the ploughed lands of the kingdom of Murcia. [illegible] effect, which we see that the calcareous [illegible] produces every where, we think it produces in the soils to which it is given, and where [illegible] the circumstances which favor the formation of nitrates, viz: humidity, vegetable mould, and exposure to the air. But, according to the experiments of M. Lecoq and others, and the opinion which is established of the old agriculturists, the nitrates are the most fertilizing salts. It would be then to their formation, which it promotes in the soil, that lime owes, in part, its effect on vegetation.

37. The [illegible] proof of the daily formation in the soil, and by vegetable life, of saline and earthy compounds, taken in nature and on a great scale, are [illegible] sufficient; but they may still be supported by the experiments and opinions of able men who have adopted the same system.

And first—in the experiment of Van Helmont, in five years, a willow of five pounds grew to weigh 169, and had caused a loss of only two ounces to the soil which bore it. But the 164 pounds which the willow had taken contained five [illegible] which are due entirely to absorption [illegible] the leaves and the other droppings of [illegible] would have given [illegible] pound of ashes, which makes up [illegible] of the sheet of [illegible] in which [illegible] it might have received in the [illegible] circumstances. Boyle has repeated and confirmed this experiment in all its parts.

NAMES OF PLANTS	Ashes from 1000 parts dry.	Constituents of 100 parts of ashes.					
		Soluble Salts.	Earthy phosphates.	Earthy Carbonates.	Silicia.	Metallic Oxides.	Loss.
Wheat, in flower,	——	43,25	12,75	0,25	32	0,5	12.25
Do. seeds ripe,	——	11	15	0.25	54	1	18,75
Do. seeds ripe,	33	10	11.75	0.25	54	0.75	23
Straw of wheat,	43	22.5	6.2	1	61.5	1	7.8
Seeds of do.	13	47.16	44.5	——	0.5	0.25	7.6
Bran,	52	4.16	46.5	——	0.5	0.25	8.6
Plants of maize (Indian corn) a month before flowering,	122	69	5.75	0.25	7.5	0.25	17,25
Do. in flower,	81	69	6	0.25	7.5	0.25	17
Do. seeds ripe,	46						
Stalks of do.	84	72,45	5	1	18	0.5	3.05
Spikes (tassels) of do.	16						
Seeds of do.	10	62	36	——	1	0.12	0.88
Oats, (entire plant,)	31	1	24	——	60	0,25	14,75

The proportion of soluble salts, 2 per cent. found by Kirwan in barn yard manure, however correctly ascertained in a particular case, can no more be relied on as a fixed and uniform proportion, or even a true general average, as used by M. Puvis in the estimates above. Ed. Farm. Reg.

Lampadius, in different isolated compartments, some filled with alumine, others with silex, others with [carbonate of] lime, all pure, has made to grow plants, of which the burning has yielded to analysis like results, and which, consequently, contained earths which were not in the soils which bore them.

Saussure, in establishing that plants do not take in the soil more than a twentieth of their substance, in extract of mould and in carbonic acid, has necessarily established, by the same means, that almost the whole amount of fixed principles do not proceed from the soil.

Braconnot has analyzed lichens, which contained more than half their weight of oxalate of lime—and he has observed others covered with crusts of carbonate of lime, when there was none of this earth in the neighborhood.

Shrader, in burning plants grown in substances which did not contain any earthy principle, has found in their ashes, earths and salts which were neither in the seeds sown, nor in the pulverized matters in which the plants grew.

Lastly—the analyses of Saussure, though showing more of the carbonate of lime in the ashes of plants which grew on calcareous soils, than on soils not calcareous, yet nevertheless, they have formed more than a sixth of the ashes from vegetables on silicious soil—and Einhoff has found 65 per cent. of lime in the ashes of pines grown on silicious soil.* The labors of science then confirm what we have above established, that plants, or the soil, form salts and earths.†

38. The fertilizing effect of fallow, of ploughing, of moving and working the soil, prove still more that all these circumstances determine the formation of fertilizing principles, and probably of saline principles, in all the parts of the soil which receive the atmospheric influences.

But salts are also formed in plants. The nitrate of potash, which takes the place of sugar in the beet—the oxalate of potash, so abundant in sorrel—the carbonate of potash in fern, in the tops of potatoes, and in almost all vegetables in the first period of their life—the sulphate of potash in tobacco—the nitrate of potash in turnsole and in pellitory—prove, without reply, that vegetation forms salts, as it forms the proper juices of plants, since the soil contains the one kind no more than the other. But can we say where plants take the elements necessary for all these formations? They can take them only in the soil by means of their roots, or in the atmosphere—in the soil, which would itself take them in the atmosphere, in proportion to the consumption of plants—or directly in the atmosphere by means of their leaves which would there gather these elements. And if the analyses of the soils, and of the atmosphere, show almost none of these elements, it would be necessary to conclude from it, that the substances which analysis has found there, are themselves, or would furnish, if decomposed, the elements of the saline substances, although science may not yet have taught us the means of reaching that end.

39. The formation of lime, like that of the saline principles necessary to plants, is an operation which employs all the forces of vegetation—and these forces, directed to this formation, have no energy left to give a great developement to plants: but when the vegetable finds the calcareous principles already formed in the soil, it makes use of them, and preserves all its forces to increase its own vigor and size.

It would then result, from all that has been said, that lime modifies the texture of the soil—makes it more friable—invigorates it—renders it more permeable—gives it the power to better resist moisture as well as dryness—that it produces in the soil the humate of lime which encloses a powerful means of fertility—that lime increases much the energy of the soil and of plants to draw from the atmosphere the volatile substances of which plants are composed, oxygen, hydrogen, carbon

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*It is presumed, from the context, that these silicious soils, were not the least calcareous. ED. FARM. REG.

† Van Helmont's experiment, cited first in the list above, like M. Puvis' reasoning in general, furnishes ample proof that most of the volatile parts of vegetables, and the greater part of their bulk, are drawn from the atmosphere—and they are equally defective in proving that *earths* and other fixed principles are thence derived, or are formed by the power of vegetable life. Distilled water is not entirely free from earthy matter, and if it had been used for watering the willow, it would in five years have given some considerable part of the five pounds of solid matter in the ashes. But as we are not told that it was either distilled or rain water, it may be inferred that the comparatively impure water of a fountain or stream, was used for watering the plant, and which would more than suffice in so long a time, to convey the whole increase of earthy and saline matter. The experiments of Lampadius and Shrader are liable to the same objection—and the former to this in addition—that his earths were deemed absolutely pure, when, in all probability, they were not so—and that a very slight admixture of other kinds with each, would furnish the minute quantity that a small plant could take up during its short and feeble existence under the circumstances stated. The results stated of the experiments of Braconnot, Saussure and Einhoff, may be, and probably are, entirely correct—but they are fully explained by the doctrine of *neutral soils,* and need no support from, and give none to our author's doctrine of the formation of lime by vegetable power.

But though deeming Mr. Puvis altogether wrong in this, his main and most labored position, and that the proofs cited above, as well as some others in the preceding section, are of no worth, still these pages which present his theory, contain what is of more value. He places in a strong point of view the important truth that the atmosphere is the great treasury of manure, from which nature doubles and triples the amount of all the small portions given to the earth by the industry of man. The author's scale of actual products from different grades of soil is also interesting. It sustains the position assumed in the *Essay on Calcareous Manures,* that the worst soils are limed (or made calcareous) to most profit—and that alimentary manures, when needed, are most productive on the best soils.—ED. FARM. REG.

and azote—that the limed soil, in furnishing to plants the lime which they need, relieves the soil and plants from employing their powers to produce it—and finally, that lime promotes the formation of fixed substances, earthy or saline, necessary to vegetables. All this whole of reciprocal action and reaction of lime; on the soil, plants and atmosphere, explains in a plausible manner, its fertilizing properties. We would, consequently, have nearly arrived at the resolving of an important agricultural problem, upon which were accumulated all these doubts.

The amount of lime taken up by vegetation.

40. The ashes of plants from calcareous soils, or those which have been made so by manures, contain 30 per cent. of the carbonate and phosphate of lime, which, by taking off the crop, is lost to the soil. But the product of limed land of middle quality, is during the two years of the course of crops, about 20,000 lbs. of dry products to the hectare, which contain a little less than a hectolitre of lime in the calcareous compounds of the ashes. The vegetation has then used half an hectolitre a year. But we have shown that there was necessary, on an average, three hectolitres per hectare, each year. Vegetation then does not take up, in nature, but a sixth of the lime which is given profitably to the soil: the other five-sixths are lost, are carried away by the water, descend to the lower beds of earth, are combined, or serve to form other compounds, perhaps even the saline compounds, of which we have seen that lime so powerfully favors the formation. Another portion also, without doubt, remains in the soil, and serves to form this reserve, which in the end, dispenses, for many years, with the repetition of liming.

Of the exhaustion of the soil by liming.

41. "Lime," it is said, "only enriches the old men: or it enriches fathers, and ruins sons." This is indeed what experience proves, when, on light soils, limed heavily, or without composts coming between, successive grain crops have been made without rest, without alternations of grass crops, or without giving to the soil alimentary manures in suitable proportion. It is also what has happened when magnesia, mixed with lime, has carried to the soil its exhausting stimulus. But when lime has been used in moderation—when, without over-burdening the land with exhausting crops, they have been alternated with green crops—and that manure has been given in proportion to the products taken off—the prudent cultivator then sees continue the new fecundity which the lime has brought, without the soil showing any sign of exhaustion. No where has there been complaint made of argillaceous soils being damaged by lime; and the productiveness of light soils is sustained, in every case that the lime was used in compost.

In America, where the lime of oyster-shells has taken the place of that of magnesian limestone, the complaints of the exhausting effects of lime have ceased.

*Healthiness given to the soil and to the country by calcareous agents.**

42. The unhealthiness of a country is not caused by the accumulation of water, nor from soil being covered by water. Places on the borders of water do not become sickly but when the water has quitted some part of the surface which it previously overflowed, and the summer's sun heats the uncovered soil, and causes the decomposition of the remains of all kinds of matter left by the water, and contained in the upper layers of the soil. Thus, ponds are not unhealthy but when drought, by lowering the waters, leaves naked extensive margins, to be acted on by the sun and air. In rainy years, fevers on the borders of ponds are rare.

Epidemic diseases most often arise on the borders of marshes laid dry—in the neighborhood of mud thrown out of ditches or pits—and in the course of bringing new land into cultivation, where the ploughed soil is for the first time exposed to the summer's sun. In the interior of Rome, the vineyards, the gardens are remarkably unhealthy—while the sickliness disappears where the emanations from the soil are prevented by buildings. In the Pontine marshes, they cover the dried parts with water to arrest the danger of their effluvia. It is then from the soil, and not from the waters at its surface, that insalubrious emanations proceed. Waters placed on the surface, always in motion, agitated by every wind, are not altered in quality, and do not become unhealthy: but whenever they are contained in some place without power to receive exterior influences, or to have motion, they are altered in their odor, taste, and consequently injured in relation to health.

Whenever water then, without covering the soil, penetrates the upper layer without being able to run through the subsoil, it remains without motion, and stagnant, within the soil—is changed by the summer's sun, serves to hasten the putrefaction of the broken down vegetable remains in or on the mould, and the exhalations from the ground become unhealthy. Thus are all drained marshes, of which the surface only is dry, while the water still penetrates the subsoil—thus, all the margins of rivers which have been covered by recent inundations of summer, are unhealthy: thus also, (for a great and unhappy example) the argilo-silicious plateaux, whenever the closeness of the subsoil does not let the water pass through, produce, in dry years, at the close of summer, emanations which attack the health of the inhabitants.

43. But this unhappy effect appears almost no where in calcareous regions: the margins of lakes

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*There was no position in the *Essay on Calcareous Manures* which its author assumed with so much hesitation as the agency of those manures in removing causes of disease. That hesitation did not arise from doubt of the truth of the position—but because of its very high importance, and its entire novelty—its being then sustained but by few known facts furnishing direct evidence, and by no known authority whatever of earlier writers. It is therefore the more gratifying to find in the work now presented, that about the same time, another and far remote investigator of the same subject, by a different course of reasoning, and by different proofs, had arrived at precisely the same conclusion—and that he maintains even more generally than the former work, the important and sure effects of calcareous manures in rendering a country more healthy.
ED. FARM. REG.

and ponds there situated do not produce the same unhealthiness, and even the marshy grounds there are less unhealthy.

The waters which spring out of, or run over calcareous beds, are always healthy to drink. The borers of Artesian wells are anxious that the water which they obtain, to be good, may come out of the calcareous strata which they go through. When the waters which hold carbonate of lime in solution in carbonic acid* run over the surface, they give health to the meadows, in changing the nature and quantity of the products.

Linnæus thought that the unhealthiness of most countries depended on the nature of the water, and was owing to the argillaceous particles which they contain; now these argillaceous particles are always precipitated by the calcareous compounds. For this reason, the waters which stand upon, or run over marl, or calcareous rock, are almost always limpid and clear, because the argillaceous particles have been precipitated by the effect of the solution in the water of the calcareous principle, which is itself dissolved by an excess of carbonic acid.

We are not far from believing then, that throwing rich marl, or limestone, into a well of muddy and brackish water, might have the effect, in part at least, of clearing it, and making it healthy to drink. This remedy, if it should not be as useful as we think, at least could not produce any injury.

Lime, in all its combinations, destroys the miasmata dangerous to life. Its chloride annihilates all bad odors, arrests putrefaction, and in short, has subjected the plague of Egypt to the skill and courage of Pariset. The white wash of lime upon infected buildings, upon the walls and mangers of stables, is regarded as serving to destroy the contagious miasmata of epidemic and epizootic diseases.

Lime destroys the plants of humid and marshy soils, and makes spring those suitable to better soils: then its effect is to give healthiness or vigor to the soil, to dry it, and make it more mellow and permeable. The water then is no longer without motion, and altered consequently in its condition. The limed soil then, to the depth it is ploughed, ought to change the nature of its emanations, as well as its products: and if the lower strata or subsoil, send up emanations, these effluvia in passing through the improved layers of soil, where the calcareous agent is always at work, and developing all its affinities, ought also to be modified, and take the character of those of the upper bed. The limed soil then, it would seem, ought to be made healthy.

But what we maintain here by induction, by reasoning, is fortunately a fact of extensive experience. Among all the countries in which lime has carried and established fertility, there is not cited, that I know of, a single one where intermittent fevers prevail—while that they have not disappeared in the country even where an active culture draws good products from the impermeable argilo-silicious soil.

44. To extend the great benefit of healthiness to the whole of a country, it is no doubt necessary that the whole country should receive the health-giving agent. However, on every farm, in proportion as liming is extended over its surface, the chances of disease will be seen to diminish—and the healthiness of the country will keep pace with the progress of its fertility.

Result of the use of improving manures on the soil of France in general.

Three-fourths of the whole territory of France, to be rendered fruitful, have need of calcareous agents. If the third of this extent has already received them, (which we believe is above the truth,) upon the other two-thirds, or the half of the whole, the agricultural products, by this operation, would be increased by one-half or more, or one-fifth of the total amount. But agriculture, in enriching itself will increase its power, its capital and its population, and will naturally carry its exuberant forces, its energy and activity to operate on the greater part of the 7,000,000 of hectares of land now [*en friche*] untilled, waste, and without product. By bringing these lands into cultivation and fertilizing them by liming or by paring and burning the surface, they would be made to yield, at least, one-sixth of the total product. The gross product of the French soil, then increased by a third or more, might give employment and sustenance to a population also one-third greater than France now possesses: and this revolution due successively to the tillage of the soil, to annual improvements keeping pace with the progressive increase of crops, would be insensible. The state would grow in force, in vigor, in wealth, in an active and moral population, which would be devoted to peace, and to the country, because it would belong to this new and meliorated soil. And this great result would be owing simply to applying calcareous manures to the extent of the soils of France which require them!

46. Upon our extent of 54,000,000 of hectares, our population increased to 44,000,000, would have for each, one hectare and a quarter, and would be less confined than the 24,000,000 of inhabitants of the English soil, who have only one hectare to the head: and yet our soil is at least as good, and it is more favored by climate. And then our neighbors consume in their food, at least a fourth or fifth of meat, while only one-fifteenth of the food of our population consists of meat; and as there is required twelve or fifteen times the space to produce meat as bread, it follows, that twice the extent of soil is necessary to support an Englishman as a Frenchman. Hence it results, that with an increase of one-third, our population would still have a large surplus product which would not exist in England, with an equal increase of population and equal increase of products of agriculture.

But this prosperity of the country, (yet far distant, but towards which however, we will be advanced daily—) would be still much less than in the department of the North, where a hectare nearly supports two inhabitants. And yet they have more than a sixth of their soil in woods, marshes, or unproductive lands: they have be-

*As in limestone water, lime with the greatest proportion with which it can combine of carbonic acid, (forming super-carbonate of lime,) is soluble in water. The excess of acid is lost by heat, by exposure to air, &c. and then the lime is in the form of carbonate—and being insoluble in water, falls separate to the bottom. Ed. Far. Reg.

sides, another sixth, and of their best ground, in crops of commerce, which consume a great part of their manure, and which are exported almost entirely. This prodigious result is, without doubt, owing in part to a greater extent of good soil than is found elsewhere; but it is principally owing there, as well as in England, to the regular use of calcareous manures. As we have seen, more than two-thirds of this country [the North] belongs to the class of soils not calcareous, to the argilo-silicious plateaux, and makes use of lime, marl, or ashes of all kinds.

47. After this great result of increased productiveness, that upon health, although applied to the least extents of surface, would be most precious. Upon one-sixth of our country the population is sickly, subject to intermittent and often fatal fevers, and the deaths exceed in number the births. Well! upon this soil without marshes, calcareous manures would bring a growing population, more numerous than that of our now healthy parts of the country—and as labor would offer itself from every side, these regions, made healthy, would soon be those where the people would be most happy, the richest, and the most rapidly increasing in numbers.

48. If we are not under an illusion, the calcareous principle and its properties upon the soil, form the great compensation accorded by the Supreme Author to man, in condemning him to till the earth. Three-fourths of our soil seem not to produce, except by force of pain and labor, the vegetables absolutely necessary for man. On all sides, and often beneath this surface so little favored, is found placed the substance necessary to the soil, to render it as fertile as the best ground, to enable the cultivator to use for his profit the vegetable mould which it contains and has been accumulating for ages—and to cause the entire soil to be covered by a population active, moral, and well employed. And this precious condiment, this active principle of vegetation, is only needed to be applied in small proportions, to obtain products of which the first harvest often compensates for all the labor and expense. And to complete the benefit, insalubrity, which afflicts the infertile soil, disappears; the new population finds there at the same time strength, riches, and health. There, without doubt, is one of the most happy harmonies of the creation, one of the greatest blessings with which the Supreme Author has endowed the laborious man who is devoted to the cultivation of the earth.

INQUIRIES RESPECTING SUMACH.

To the Editor of the Farmers' Register.

Baltimore, Sept. 12, 1835.

Some years since the attention of the agricultural public was invited, in the American Farmer, to the practicability of turning to valuable account, the *sumach*, which grows spontaneously, and in great abundance, in the middle states. What a lovely ornament to our lawns, if planted and cultivated to its attainable size. Its cool delicate green leaf, and the lively contrast of its red berry! If it were only brought from the East Indies at the cost of some guineas a plant! I do not know to what extent that reference to the subject attracted the notice of the people of Maryland, where the plant is to be seen on every road side; but passing lately through that picturesque and delightful region of your state from Warrenton to Charlottesville, I observed quantities of the plant in a course of preparation for market, and the driver of the stage assured me that many poor people made three or four dollars a day by gathering and curing it.* I could not learn from him precisely what parts of the plant, whether leaves only, or leaves and stems, were gathered, nor how long it takes to cure them, nor how they were put up for, and sold in market, so I determined to ask you to look into the subject, if you should deem it of sufficient importance, and to give some practical hints for those who would avail themselves of an article which requires no labor of cultivation, and which by those who may deem it of insignificant value, will not be denied to the hands of those whose circumstances may lead them to gather it for sale.

In the south, where slave labor is employed, and farms so extensive, the proprietor relies only on a few great staples, whereas, in New England, and among the Dutch, "every little makes a mickle;" so that the northern husbandman, acting on the principle that "take care of the pence, the pounds will take care of themselves," would ask nothing easier than to rear a family and grow rich on the waste lands, and head lands, and the offal of a Virginia estate. Tell us about the sumach.

J. S. S.

[The sumach is used in the process of preparing morocco leather. Our correspondent will find some account of it at page 152, Vol. I. of the Farmers' Register. We suspect that he heard a greatly exaggerated report of the profits of the gatherers.]

From the Farmer and Gardener.

SHEEP HUSBANDRY.

Mr. Editor—In your valuable "Farmer" for June 2d, I notice a few remarks on "wintering sheep." The importance of this animal as regards flesh, and fleece to our comforts, is prover-

*In travelling, (through a new district especially,) I make it a point if I can, to get by the side of the driver; and much it is to be desired that our stage coaches were better fitted, as in England, for that indulgence. You have a better view of the country, and few men are to be found in any station so ignorant but that you may entract information or entertainment: and moreover I always find that by *studying and indulging the humor* of the driver, you may always get a mile an hour more out of him. Am I under the blade of the village chronicle, with my life in hands, I always *make him talk*, and learn more of the place and its *characters*, than a fine gentleman would tell you in a week. But compliment on the importance of his vocation—how necessary to the comeliness of the dandy, and to the comfort even of the most slovenly of mankind—praise the light, skilful, and renowned handling of his razor, and with "a marvellous control over facts," he will amuse you with all he knows, and a little more. The most important facts in natural history have been gathered from the unlettered ploughman and the roving hunter. There are in fact few men or books, from which something may not be learned by those who have the philosophy to feel, and the wisdom to acknowledge, that in the midst of light we are yet in darkness. S.

bial, and consequently, merits a full share of attention to its support, as well as propagation.

I have tried some ten or twelve different modes of supporting this animal, in a climate, peculiarly inviting the rearing of sheep. Where it can possibly be had, green rye ought to be secured, to allow them, if but a few mouthfuls per day, particularly at lambing time; but at all times, it appears to be singularly effectual, in preserving a high state of animal health. A few turnips thrown to them every day is essential to produce the same effect. To these oats may be added, cut just before they are perfectly ripe, and housed, without getting wet. But sir, in the south a much more economical preparation can be readily had—superior in quantity and quality, per acre, to the best clover field. After the oats is taken from the field, turn over the stubble on the cow or tory peas, sow about half a bushel to the acre. In a common season, about the time the peas are ready for curing, by pulling up the vines, and thus saving peas and vines together, it will be found that the *crap grass* will be, not only high enough to cut, but so far in seed, as to furnish a rich hay. Cut then the whole with scythes, and cure as hay, salting well while stacking. Submit this food to the cutting box, feed in troughs, and mix it, half and half, with the oats cut off the ground, the same season, cut up also. Add to this, five turnips per day for each sheep, if the turnips are small, and three if large, or *Ruta Baga.* The fondness of the sheep for the pea, is well known. The strength or nutritive quality of the vine and leaf, when properly saved as fodder, is equally known to southern planters. Salt well, of course, and let tar be in the bottom of the salt trough:—a little pulverized tobacco once a week with the salt, permitting the sheep to ramble through an adjacent woodland, particularly, if hilly, about half the day, in good weather. Sheds for them of course in bad. On trial of this plan it will be acknowledged that the number one acre will support, in high health and fleece, will meet the expectations of the most perfect economist. Like all other animals a state of costiveness is inimical to animal health, but in the sheep, this is readily prevented, by either rye or turnip. The pea agrees well, in every particular with that animal. Rye-straw saved well, and cut before ripe, is superior to oats straw. Barley straw is excellent, and rice straw superior:—and will be found a substitute for the oats, if the turnip is added. A small barley or rye lot, will give the requisite quantity to secure the highest health, of one hundred sheep. Thirty minutes per day, if the turnips are added, will be sufficient. The quantity of green vegetable food, taken in during this short period, with the above quantity of turnips, will secure a healthy fermentation in the stomach of the dry food, secure a high degree of health in the animal, and of course, flesh and fleece. By a little attention to littering with dry litter, on dry ground, a quantity of superior manure may be secured. To save the urine the pen ought to be laid with dry earth, previous to penning, removing it at proper intervals.

AGRICOLA.

Woodlands, Alabama, July 22d, 1835.

From the Farmer and Gardener.

DESTRUCTION OF GARLIC.

Sir—Some time ago, I promised to give you a history of my experience and progress in the extirpation of garlic, which promise I shall now attempt to perform.

The first appearance of garlic on my farm, I think, was between 50 and 60 years ago. My father, who was then living, used every means in his power to eject the unwelcome tenant from the premises, but every effort appeared fruitless; as we occasionally tended the field, it spread still wider and wider. Giving up all hope of subduing it, after taking out a great deal every year, and finding it still continued to enlarge its bounds, we, in order to prevent its taking possession of the whole field, laid off a cut of about six or seven acres in the corner of the field which it occupied, and let it run, as well as I remember, for several years unmolested—stacking the grain—treading it out, and feeding the straw on the foul premises.

After the death of my father, (in 1801,) I adopted the mode of fall ploughing for my spring crops, and without anticipating any beneficial results, farther than that of loosening and pulverizing the ground, I flushed up this foul spot of oats in the spring, rather shallow, (as old fashioned ploughing.) When the oats were, I think, about knee high, a friend walked out with me, to look at them, and to my pleasing astonishment, there were but very few heads of garlic to be seen. I then began to reflect what could be the cause, and remembered that the ground was ploughed up very late in the fall, or early in the winter, and consequently, all the germinating power of the exposed garlic, was killed by the frost, before it had time to dry by the sun or air. I am of opinion that a bunch of garlic might be pulled up in the month of June or July, and laid upon a stump to dry until November, and if then planted, that it would grow again; but let it freeze while the pulp is in it, and its vegetating property will be completely destroyed.

Having thus by mere accident, so nearly gained a victory over my invading enemy, I again commenced the attack by carefully taking it up every spring, and so far succeeded, that about ten or twelve years ago, I had four cradles running in the whole field, including that foul cut, and offered a *fippenny-bit* for every head that the reaper should find, and my leader alone found one.

However, we still continue to look out for it every spring, and sometimes find a few heads, which I think are probably dropt by our horses after being fed abroad with foul oats.

At a farm I lately purchased there was a field very full of garlic; I conceived an additional plan of teazing and making a "demonstration" on the enemy, to wit:—I broke it up of moderate depth about the first of December, and was determined as soon as there came one freezing night upon it, after ploughing and a thaw, to run a sharp toothed harrow over it again, and so alternately after every freezing and thawing spell during the winter, in order to turn it up, and expose it to the frost as often as I could, but the winter was very unfavorable to such an enterprise, being in the forepart covered with snow, and in the latter part, continually frozen. I did not go over the field myself in the spring: but my manager told me, that there was an abundance of garlic on the top of the ground, as red as much, and when cutting the oats at harvest, although there was a considerable quantity which had escaped, my manager says, he is certain there would have been ten times as much had it not been for winter treatment. Having thus given my history on the culture of garlic, if you or any of your readers will in return, instruct me how to repel those *pests of mischief, Carolina pink, wild carrots*, and the *blue thistle*, which are now commencing their attacks of violence, your account will stand equally balanced, with that of your friend and humble servant,

THOMAS RILLEN.

Extracts from Ure's Philosophy of Manufactures.

COMPARISON OF STEAM AND HORSE POWER.

The value of steam-impelled labor may be inferred from the following facts, communicated to me by an eminent engineer educated in the school of Boulton and Watt:—A manufacturer in Manchester works a 60-horse Boulton and Watt's steam-engine, at a power of 120 horses during the day, and 60-horses during the night; thus extracting from it an impelling force three times greater than he contracted or paid for. One steam-horse power is equivalent to 33,000 pounds avoirdupois raised one foot high per minute; but an animal horse-power is equivalent to only 22,000 pounds raised one foot high per minute, or, in other terms, to drag a canal boat 220 feet per minute with a force of 100 pounds, as ascertained by experiment. Hence, a steam-horse power is equal in physical efficiency to one living horse, and one half the power of another. But a horse can work at its full efficiency only eight hours out of twenty-four, whereas a steam-engine needs no period of repose; and, therefore, to make the animal power equal to the physical power, a relay of one and a half fresh horses must be found three times in the twenty-four hours, which amounts to four and a half of horses daily. Hence, a common 60-horse steam-engine does the work of four-and-a-half times 60-horses, or of 270 horses. But the above 60-horse steam-engine does one-half more work in 24 hours, or that of 405 living horses! The keep of a horse cannot be estimated at less than 1s. 2d. per day; and, therefore, that of 405 horses would be about £24 daily, or £7,500 sterling, in a year of 313 days. As 80 pounds of coals, or one bushel, will produce steam equivalent to the power of one horse in a steam-engine during eight hours' work, sixty bushels, worth about 30s. at Manchester, will maintain a 60-horse engine in fuel during eight effective hours—and 200 bushels, worth 100s., the above hard-worked engine during twenty-four hours. Hence, the expense per annum is £1,565 sterling, being little more than one-fifth of that of living horses. As to prime cost and superintendence, the animal power would be greatly more expensive than the steam power. There are many engines made by Boulton and Watt, forty years ago, which have continued in constant work all that time with very slight repairs. What a multitude of valuable horses would have been worn out in doing the service of these machines! and what a vast quantity of grain would they have consumed! Had British industry not been aided by Watt's invention, it must have gone on with a retarding pace in consequence of the increasing cost of locomotive power, and would, long ere now, have experienced, in the price of horses, and scarcity of water-falls, an insurmountable barrier to further advancement: could horses, even at the low price to which their rival, steam, has kept them, be employed to drive a cotton-mill at the present day, they would devour all the profits of the manufacturer.

Steam-engines furnish the means not only of their support but of their multiplication. They create a vast demand for fuel; and, while they lend their powerful arms to drain the pits and to raise the coals, they call into employment multitudes of miners, engineers, ship-builders, and sailors, and cause the construction of canals and railways; and, while they enable these rich fields of industry to be cultivated to the utmost, they leave thousands of fine arable fields free for the production of food to man, which must have been otherwise allotted to the food of horses. Steam-engines, moreover, by the cheapness and steadiness of their action, fabricate cheap goods, and procure in their exchange a liberal supply of the necessaries and comforts of life, produced in foreign lands.

THE TOMATO.

Dr. Bennett, the Professor of Midwifery, and the Diseases of Women and Children, Hygeine and Medical Jurisprudence, in the Medical College of Lake Erie, and the Medical Department of the Willoughby University of Lake Erie, at Chagrin, Cuyahoga Co., Ohio, in his public introductory lecture, delivered in that flourishing institution, made the following statement relative to the *Solanum Lycopersicum*, or as it is generally called tomato, love apple, Jerusalem apple, &c., to wit:

1st. That it (the tomato,) is one of the most powerful deobstruents of the Materia Medica, and that in all those affections of the liver, and other organs where calomel is indicated, it is probably the most effective and least harmful remedial agent known to the profession.

2d. That a chemical extract will probably soon be obtained from it which will altogether supercede the use of calomel in the cure of disease.

3d. That he has successfully treated serious diarrhea with this article alone.

4th. That when used as an article of diet, it is almost a sovereign remedy for dyspepsia, or indigestion.

5th. That persons removing from the east, or north, to the west, or south, should by all means make use of it as an aliment, as it would in that event, save them from the danger attendant upon those violent bilious attacks to which almost all unacclimated persons are liable.

6th. That the citizens in general should make use of it, either raw, cooked, or in form of a catsup, with their daily food, as it is the most healthy article of the Materia Alimentaria, &c.

Now if these positions be true, it is of the utmost importance that the public should be made acquainted with the facts, and it is with this view that I now make this communication for the press.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

[Continued from p. 355 Vol. III.]

On folding sheep.

With regard to the practice of folding sheep, there is much difference of opinion. The late eminent Mr. Bakewell was decidedly averse to the practice of folding, considering the advantages supposed to be derived from it as visionary; as, in fact, robbing a larger portion of a farm in order to enrich a small part. He was of opinion that the keeping of large flocks together, even of any number exceeding a hundred, is a barbarous practice, as the strongest will always consume the best food, which ought to be appropriated to those which are less hardy; and observed, "that if folding be necessary on farms that have no commons appendant to them, why should there not be different small folds, on different parts of the farm, for animals of various ages, kinds, and strength, and thereby save the trouble of driving them from one part of a farm to another? For, is it not preferable, after the animal has filled its belly, that it should lie down to sleep (and let it not be forgotten, that repose contributes materially to promote fattening) than travel, in order to create an appetite?" From extensive and accurate observations, in various parts of this island, Mr. Bakewell became confirmed in his opinion of the inefficacy of folding, and his example has been followed by many of our most enlightened agriculturists, who have relinquished the practice; for, however beneficial it may be to the folded land, it has been found prejudicial to the sheep, unless when it has been resorted to for the purposes of shelter. Not only, indeed, are those lands, which are in any degree moist, liable to be poached by the treading of the animals, but also these are injured by the wet, and by being driven to and from the fold, are liable to be excessively fatigued; so that the stronger sheep only can feed without receiving much detriment. Besides, young lambs are often seriously injured: the ewes are liable to be hurried and heated; and the weaker animals are thus prevented from feeding at pleasure. There are, however, many light soils which cannot be tilled to advantage without the assistance of the fold, and on these the custom is necessarily continued: but it is only properly applicable to fold flocks and store sheep; for the purposes of folding and fattening are wholly distinct, as are the breeds most appropriate to each. The fold requires a hardy, active animal that can bear fatigue; but that which will stand still and eat, is best adapted for the grazier.

On breeding farms, sheep of different ages are generally kept asunder, unless when the number is so small that they are under the care of only one shepherd; but the idea above suggested, by Bakewell, of keeping all sheep in small flocks, is very important, and it merits attentive consideration. There are, however, numberless down-farms where the fold is so much an object that without it they could not be cultivated, and on these *straggling* folds the practice would evidently be expensive as well as injurious. On such land, many farmers give a very slight dressing, one night in a place, and the fold three square yards per sheep; whereas they ought to be folded two nights in the same spot, and one, or at most two, square yards allotted to each animal; for if arable, the ground should be perfectly black, and if grass, well covered with dung. The common calculation is, that 3000 sheep are sufficient to fold an acre in one night; but it is evident, that the quantity of manure must depend upon that of the food consumed; and its value will be in proportion to the fattening quality of the provender: thus, the dung of sheep fed on oil-cake is of a much more fertilizing nature than that produced by turnips; but the latter afford the largest amount. The kind of sheep must also influence the number to be folded; the larger and coarser-feeding breeds requiring more space and yielding more manure than the small heath species. On the South Downs the calculation is 500 to 28 square perch.

On land that is too wet to carry sheep upon the fallows, all the advantage of the moveable fold in collecting the dung, together with greater advantage to the flock, may be secured by having a *standing fold* on a dry spot in the most convenient part of the farm; or, where the flock is small, or that it is considered material to afford superior shelter, a part of the farm-yard may be fenced in, and provided with sheds open towards the sun, and having pens for receiving the flocks accordingly as they are separated, so that the sheep may be let out to exercise themselves on the land for a few hours in the middle of the day, unless the weather be extremely unfavorable. In this system of *cotting*, the floors of the various sheds ought to be well beaten in, and laid on a slight declivity, for the discharge of the urine, which, as well as the dung, should be frequently removed: for cleanliness is essential to the thriving of these animals. The practice here stated, will, indeed, render an abundant supply of litter necessary, and whether the additional expense thus incurred is compensated by the supply of manure thereby obtained, is worthy of consideration. It appears, from an experiment on record, that 134 sheep, and 30 lambs were penned for six weeks, in a standing fold, and littered with one load of straw, per week, which produced *twenty-eight* large loads of dung. They were fed morning and evening in the fold with drawn turnips, and, during that time, consumed two acres of those roots, thus:—

Valuing dung at 7s. 6d. per load,	£10	10	0
——— straw at 20s. per load,	6	0	0
There will remain	4	10	0
or, per acre for turnips,	£ 2	5	0

There can be no doubt that all animals soiled in yards or stables will produce more manure, in the proportion of the litter, than those which are fed in open fields: and it is also more than probable that a fermented compost, so made, will prove more effectual, when regularly spread over the land in due season, than dung promiscuously dropped at various periods. These observations more especially apply to heavy cattle: which, besides being apt to poach the land, do not distribute their dung so equally as sheep. But, independently of the fact, that the treading of sheep is beneficial to light soils, there are the important considerations of convenience, expense, and comparative profit. With regard to the first, it is not always convenient to spare men and teams for turning, carrying out, and spreading manure: then the expense of all that labor must be deducted from the value of the dung; and lastly, considering that 3000 will fold an acre of land in a night, and regarding the number mentioned in the experiment as equal, with the lambs, to 150 sheep, it follows, that in six weeks they would have folded two acres, *without the straw*. It is unnecessary to pursue the calculation, for it is sufficiently obvious that it turns the scale of profit, *on the mere manure*, in favor of the common fold; but with regard to the more important consideration, the health of the sheep, there can be no doubt that the standing fold is more beneficial in severe weather, and more particularly to fatting stock. On the score of expense it should, however, be remarked, that the litter charged in the experiment is unnecessarily dear. Straw used upon a farm, can only be considered worth twenty shillings a load for the purpose of feeding; and, in this instance, fern, or dried leaves, if procurable, or stubble, would have answered the purpose equally well, while a material difference would have appeared on the account.

The respective advantages, and disadvantages, of these several methods may be thus concisely stated:—

The common *moveable fold* allows the land to be manured without any further cost than the trouble of removing the hurdles; but, being usually placed upon arable land, the dirt is injurious to the fleece; it prevents the sheep from fattening; and the wet retained by the ground is prejudicial to their health.

The *standing fold* admits of the most convenient choice of situation; and, whether littered or not, allows of the dung being accumulated to form a compost, and applied to the land at the most proper season—advantages which the moveable fold does not possess; but it occasions the additional expense of removing the dung, forming the compost, and spreading it on the soil.

The *cote* combines all the advantages, and disadvantages, of the standing fold, with the additional merit of affording superior shelter; but it also occasions the additional expense of the erection of sheds.

As to *housing* sheep in close stables, it is contrary to the nature of the animal, and is a practice by no means to be recommended, except when it may be absolutely necessary to shelter tender ewes from great inclemency of weather at lambing time; and even then, an inclosed yard, or at most, an open shed is preferable. Except in such cases, it may, indeed, be very questionable whether the animal is benefited by any of these methods. Nature has provided it with a covering which effectually secures it against cold and rain, and has evidently adapted different breeds to different climates: the hardy mountain sheep braves every kind of weather, and not only thrives on the most scanty herbage, and in the most exposed situations, but is even found to degenerate on richer soils. It is the introduction of tender breeds on land not adapted to them that has occasioned any necessity for shelter, unless when it may be prudent, on the bleak hills of the north, to guard against the consequences of snow storms; or when, from the absolute failure of field pasture, it may be expedient to pen the sheep for the purpose of more conveniently feeding them.

With respect to the fold, it can only be considered advantageous in so much as regards the land; and notwithstanding the objections already stated, it must be admitted that there are many arable hill-farms which could not be cultivated without such assistance. In such situations, it is sometimes next to impossible to manure the land in any other way; and although, from the injury done to the sheep, and the increased consumption of food—folded sheep, having been ascertained to eat more, and to thrive less, in consequence of additional exercise, than those which lie quiet in their pasture—it has been said, "that folding is gaining one shilling in manure by the loss of two in flesh," yet the expedience of the system is still a mere matter of calculation of the relative profit to be obtained by growing corn or feeding sheep.

[To be continued.]

TREATISE ON IRRIGATION.

Extracted from the Practical Irrigator and Drainer.

By George Stevens,

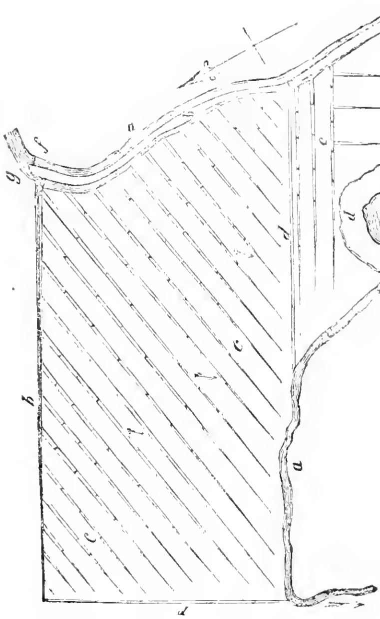
[Continued from p. 351 Vol. III.]

Catch-work irrigation.

This species of irrigation is very different from that which I have described and recommended above, and which ought never to be resorted to when the bed-work plan is practicable. In some situations, however, the declivity of the ground is too great to admit of its being formed into beds, with their respective feeders pointing down the descent; and, therefore, it is requisite to make the feeders at a certain distance below each other, across the declivity, to catch the water, again and again, from the higher to the lower part of the meadow. By this method, it is evident that the contents of the water, thus repeatedly used, are not equally disposed of, for the upper beds must undoubtedly receive a greater part of whatever sediment it deposites. The best method to obviate this inequality of distribution of the sediment, is to continue the conductor down the centre or highest part of the declivity to the last bed, by which means a certain quantity of the first and richest water will be conveyed unused to every bed. In some catch-work irrigation, the only open drain for carrying away the water is at the lower side of the meadow; in others, again, such as the Whitehaugh meadow, belonging to Sir John Hay, and the Townfoot meadow of Dolphington, belonging to Richard Mackenzie, Esq., the surface of the land is so situated, that the system of irrigation is partly bed-work and partly catch-work; for in these, some of the lower parts of the feeders become drains, and in others the upper part of the feeder is a drain, which is necessary in many situations, not only to save an immense expense in levelling, but to make the most of the water. The distance between the feeders in catch-work irrigation depends on the fall of the ground and the quality of the sub-soil. In dry porous sub-soils, with a fall of one foot in twenty or thirty, the width of the beds might be made from fifteen to twenty yards; but when the declivity of the ground is less, and with a wet sub-soil, the width of the beds should never exceed ten yards. (See plan 2.)

Catch-work irrigation should never be resorted to unless absolutely necessary. I have seen it

Plan 2.



a, a, Stream—*b, b,* Conductors—*c, c,* Feeders—*d, d,* Drainers—*f, g,* Sluices.

adopted where there was no rapid descent in the land to demand it; I have seen it used, merely because it was less difficult and less expensive in the execution.

In every irrigated meadow, a small side sluice should be placed in the side of the conductor, to let out any waste water that may make its escape through the head sluices; for it is of the greatest consequence that the meadow, between the different intervals of irrigation, be made completely dry, for if the water be allowed to run dribbling the whole season, the consequence will be, that the driest land in a very short period will either be covered with rushes or turned into a perfect bog. It is equally necessary to keep an irrigated meadow dry, as it is to make it wet at proper times.*

In the formation of an irrigated meadow, there are two rules of the greatest weight: one is, that no part of the works be made on a dead level; and the other, that every drop of water be kept in constant motion; but to give exact directions for the formation, is beyond the ingenuity of man, for no two pieces of land are precisely alike, which renders it impossible for the irrigator to follow the same plan in one field that he has done in another. Each meadow, therefore, requires a different design, the construction to be varied according to the nature of the ground, and the quality and quantity of water. Inclined planes are absolutely necessary for the purpose of irrigation; and the benefit of irrigation depends so much upon the good management and patient perseverance of those who have the superintendence of it, that I do not wonder it has so often proved unsuccessful.

However simple the construction of a water meadow may appear to be on a superficial view, those who enter minutely into the detail will find it much more difficult than is commonly imagined. It is not an easy task to give an irregular surface the equal slope requisite for the overflowing of water. It is very necessary for the irrigator to have just ideas of levels; a knowledge of superficial forms will not be sufficient. Few people unacquainted with the art of irrigation, and the regularity of form which the adjustment of water requires, have any idea of the expense of modelling the surface of a field.

Where land is very unlevel, it is sometimes advisable to break it up with the plough, and take a crop of oats, before the formation; by which means the land can be properly cleaned and pulverized before levelling it into form with the levelling plough and spade the following year—an operation which may be executed at half the expense of doing the whole with the spade and wheelbarrow. But there is one advantage by doing the whole work with spade and barrow, especially where the turf is strong, which is, that the water can be applied as soon as the beds are formed; but by breaking up, and taking a crop of oats, it will require two or three years after the grass seeds are sown before the water can be used, which some proprietors think too long to wait, therefore will rather be at an additional expense to have the turf lifted and laid down again; by so doing, the whole operations may be performed in one season. The grass seeds generally used for laying down land for water meadow are, vernal grass, crested dogstail, soft meadow grass, rough-stalked meadow grass, foxtail, fiorin grass, (*agrostis stolonifera,*) which last is one of the prevailing grasses in all good meadows; and the best way of planting it is to cut the whole into short pieces, the same way as cutting straw into chaff, and sow it with other seeds. It is not always that those grasses give a good crop the first year; therefore, to obviate this evil, some perennial ryegrass seed should be sown along with the others, to produce a crop of hay before the watering commence.

Mr. Smith, in his Essay on Irrigation, says, "it is no matter what kind of grass is sown on land prepared for irrigation, for the grasses best adapted for the soil will soon make their appearance and banish all others." This is very true, but it is equally obvious, that if you can replenish the meadow at once with the grasses best adapted to it, by sowing it with their seeds, such practice would be more profitable than to rest satisfied with the slow return of inferior crops to be obtained during the two or three years that the uncongenial grasses are going into decay, whilst the spontaneous and more congenial grasses are but slowly occupying their room. The expense of keeping a water meadow in repair is from 5s. to 6s. per acre per annum. The second year after a water meadow is made is the most expensive, on account of such places as have been forced, to bring the surface of the ground to a level, sinking unequally.

Management.

The adjustment of water flowing over the sur-

* This happened to part of Mr. Campbell's meadow at Kailzie; a few years ago the meadow was formed of a very porous soil, but the water being allowed to run too long, it made the ground boggy, and producing rushes.

face of grass land, for the purpose of improving the herbage, is a very nice operation; it requires a perfect knowledge of levels and the vegetation of grasses, and ought never to be intrusted to an unskilful manager. Where the supply of water is, in every state of the stream that supplies it, sufficient for the whole or one-half of the meadow at once, the management becomes pretty easy; for after the works are cleaned, and the water regulated in the autumn, the sluices should be fixed at such a height as to let in the exact quantity of water required, when it is allowed to run, according to the state of the weather and season of the year, for two, six, ten, or fifteen days, without any alteration; and it will be found (unless the water has carried along with it weeds, sticks, or wreck of any kind) to run during that whole period nearly as equally over the surface as when first put on. But where the stream is small, and rising and falling with every shower of rain, the management becomes so much more difficult, that it will require every possible attention of the irrigator to watch and change the water from one part of the meadow to another, or from one bed to another, according to its abundance or deficiency. Such meadows are indeed generally ill managed, although half an hour's work in a day would put every thing to rights. Indeed, let the formation of the meadow be ever so perfect, and the supply of water constant and uniform, yet it is necessary that the manager should survey the whole every three or four days, to remedy any defect occasioned by the collecting of weeds, &c., or by a stop being washed away, which would prevent the equal distribution of the water, and thereby cause some places to have too much and others too little; so that, in the former case, the grasses might either be killed or very much injured by the generation of scum, or, in the latter, there would be little or no produce of grass.

Small streams are certainly much more at command than large; but if the manager, as is too often the case with a young practitioner, vainly endeavor to water too much ground at a time, he may give one part too much water and another too little; for, on the alteration of the apertures and adjustment of the water, greatly depends not only the quality but quantity of the crop.

One of the greatest defects in the management of irrigated meadows in this country, is the not paying proper attention to freeing the ground from subterraneous and stagnant water; for experience shows that, wherever there is too much moisture beneath the surface, or if the water lodges too long upon it, the crop will always be coarse and scanty. Another great error generally committed is, allowing the water to run too long at a time, without properly drying the ground. I know some instances in this neighborhood, where the ground is not attempted to be dried from the time the water is put on the meadows in the autumn till eight or ten days before the cutting of the hay; the consequence is, that the grass is of the coarsest quality, and the ground has become so very boggy, that the whole crop of grass is obliged to be carried by people to some other place to be made into hay. Another inconvenience arises from bad management, which, I am sorry to say, is too prevalent in this country; that is, permitting the grass to stand too long before cutting; the consequence is, coarse hay, badly made, and, in many instances, half rotten,* before being put into the stack; and, moreover, owing to the lateness of the season, the aftermath is entirely lost; so that the proprietor has not received half the value of his meadow which he ought to have received, if the hay had been made in the proper season. A water meadow, like a garden, will be good for little without due attention. All dry soils require more attention than moist ones; for if the water on moist soils should not be so nicely regulated as on sandy or dry land, the crop of grass will not be so defective as on porous soils, where the management has been neglected. I presume that all dry land that has been converted into water meadows, in countries where the art of irrigation is not well known, and the supply of water not abundant or regular, is liable to more injury, from imperfect treatment, than land of a moist nature, for plants must have their food at stated times as well as animals; but this cannot be the case with the grass of a meadow where the water is irregularly applied. This is undoubtedly the reason why part of the water meadows on the Duke of Buccleuch's estates in the south of Scotland have failed. The most of those meadows were situated on the Esk, Ewes, Yarrow, and Ettrick rivers, and were generally made on alluvial soils that have been formed by the overflowing of the water, so that they were generally porous and dry; and the country, drained by these streams before entering the meadows, being mostly very poor, of course the water could not be very rich, and moreover, in dry seasons, in many cases, must have been very scanty: when we add to the account an improper management, it is impossible that a good crop should be produced. I have never yet seen a watered meadow, let the land and water be ever so poor, if the management has been any way tolerable, but what has paid every expense within three years; and, whatever people may say concerning the failure of his Grace's irrigation, I here venture to assert, that so long as a regular management was carried on, there were no complaints; but as soon as no pains were taken to keep the meadows in proper repair, and grain getting so very dear, the farmers saw the advantage of breaking them up, though I believe many of them have had every reason to repent of their folly. Several irrigated meadows were made in different parts of Scotland, about the same time as the Duke's, on the same kind of soil, with water of a similar quality; but as they have been otherwise managed, the proprietors have no reason to complain, but declare that their irrigated meadows are the most productive part of their estates.

Much has been said on the good and bad qualities of water used in irrigating grass land, and it is the favorite opinion of Mr. Smith and Mr. Davis, that spring water is as efficacious as water flowing through a rich country, or the washings of a large town, for irrigating grass land. I would here recommend to those authors, or any others who are of the same opinion, to inspect the irrigated meadows which are watered by the washings of the city of Edinburgh, where I trust they would find the superiority of muddy water to that

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* I could produce many instances of this, but the most striking is to be seen (May 1828) on a farm between Dunfermline and the Rumbling Bridge.

of clear spring water most strikingly manifested.*

Every water meadow that is properly managed is made ready to receive the first autumnal floods. It is a rule with the Wilshire and Gloucestershire irrigators (and that rule stands good in every country) to use as much water through the winter as possible, which not only shelters the grass, but leaves a considerable quantity of fertilizing manure—both contributing to assist vegetation through the dead of winter, and making the grass display the most pleasing appearance of spring, when the surrounding lands bear not the least sign of renewed vegetation, or are even covered with snow. Some imagine this effect to be produced by the warmth of the water, others may attribute it to a decomposition which it may be supposed to undergo, or to such sediments as it may deposite; but whatever be the cause, it is certain that if this opportunity be neglected, the crop will be defective in proportion. However authors may disagree on this interesting subject, I believe all experimentalists acknowledge, that early winter watering is necessary to produce early and abundant vegetation. In what way this operates is, as to practical purposes, less material.

It has been sometimes observed or alleged, that the quality of the hay made from water meadows is inferior to all other hay; but every one acquainted with the process of making hay from this grass, knows how much the good or bad quality of it depends on the management. I strongly suspect, where there is any real reason to complain of water meadow hay, it must have arisen from the grass having been allowed to stand too long before it was cut, which renders sown grass hay, as well as that of water meadows, as little nutritious as straw; or otherwise from mismanagement in the hay making.†

The hay made from several irrigated meadows in Dumfriesshire and Peeblesshire will fatten a bullock or sheep as soon as the best clover hay in the country.

The late Sir George Montgomery, Bart. of Magbiehill, who perhaps has paid as much attention to the management of water meadows, and the making of water meadow hay, as any individual in Scotland, not only gave it to his hunters, but fattened part of his flock with it; indeed there were many instances of gentlemen from England preferring his water meadow hay for their carriage horses to any other kind.

After the hay is carried off, the water is sometimes put on for a day or two to promote the growth of the aftermath; and this practice may do no harm where the aftermath is to be eaten by any other stock than sheep, but wherever sheep are to eat off the aftergrass, (unless intended for the butcher,) it is not thought advisable; for summer watering produces so very rapid a growth, and the grass imbibes so much moisture, that it is apt to cause the rot in sheep;* but neither the first crop nor aftermath, produced from mere winter irrigation, has ever been observed to have any tendency to occasion that disorder.

A water meadow attached to any farm gives the farmer a great command of manure for the part he keeps in tillage, for he carries away and converts into dung the whole of its produce of hay every year, whilst it requires nothing in return but the watering, and meanwhile is every year improving in quality and in the increase of its produce. The advantage will, no doubt, be the greater, in proportion to the richness of the water he has in his power to employ: witness the extraordinary crops of grass that are yearly carried from the meadows below Edinburgh, to feed cows in the neighborhood of that city. The grass of these meadows is cut five or six times in a year; but to support that extraordinary growth, the water is put on for a day or two immediately after every cutting; and, although it is never clear, the cattle eat the grass with the greatest keenness, which strongly militates against Mr. Smith's favorite idea of the superiority of irrigating with clear spring water.

Amongst the many prejudices against the practice of irrigation, those which relate to the quality of water, and season for using it, are the most important. All water, except what comes immediately from poisonous minerals, let it be ever so clear, is beneficial to vegetation; if properly employed, it invariably produces such grasses as are most congenial to the soil.

Irrigation, like many other operations, is but ill understood; and I am fully convinced that its ill success is more owing to bad formation and improper management than to any uncongenial qualities of the water. The general defect of crop arises from a scarcity of water and its untimely application; for, instead of wetting the ground like a shower of rain, which many unacquainted with the art suppose to be all that is necessary, the water must continue running over the surface of the ground all winter, except for a few fine days at a time, to give air and strength to the young grass, where the water may have run too rapidly or too slowly over it.

At the beginning of the month of October, each feeder and drain should be cleansed, and the banks of the feeders repaired where they have received damage by the treading of cattle. The whole works being all repaired, and there being generally water enough at this season, either for the whole or for part, the sluice should be drawn, when, in the course of half an hour, the conductor and upper part of the feeders will be nearly filled.

*The practice of irrigating with muddy water is in general use in the Mexican states, every attention being there paid to collecting the water at the time of floods into canals made on purpose, and which is afterwards used in irrigating the land.

†One of the few proprietors who pay particular attention to the making of meadow hay, is G. S. Menteath, Esq. of Closeburn. In 1828, Mr. Menteath commenced making hay in the last week of June, and in the very short period of eighteen days the whole crop (averaging three hundred stone per English acre) of one hundred and five acres was made, and carried from the fields and put into Dutch barns. If other proprietors would pay the same attention to cutting, making, and securing their natural or water meadow hay, there would be no reason for complaining of its quality.

*This was the case with a water meadow at Inverardran, near Tynedrum, in 1827. An extraordinary flood having covered the meadow immediately after the hay was cut, it produced the same effect on sheep as summer watering.

The first operation of the irrigator is to adjust the water in the conductor, or, if the meadow is in more parts than one, the water in each conductor must be first regulated; then he commences anew by regulating the stops in the first feeder, but should there not be sufficient water in the feeder, a little more must be let in, by making the aperture wider or deeper, till the water flows regularly over the sides, from one end to the other; from the first, he proceeds to the second feeder, and so on, until the water in all the feeders is adjusted.

Let the beds of a water meadow be ever so well formed, yet, by some places sinking more than others, or by the ice raising the surface of the ground, although the water along the banks of the feeders have been ever so nicely adjusted, it often happens that there may be some places between the feeders and drains with too little water, when it will be advisable for the manager to make a third round, redressing inequalities of the surface so as to give every spot an inch deep of water. Every part of the works being regulated, the water should be allowed to run through the whole of October, November, December, and January, from fifteen to twenty days at a time, without intermission. At the expiration of these periods, the ground should be made completely dry for five or six days, to give it air; for there are few species of grasses, which form the most nutritious part of the herbage of water meadows, that will long exist under an entire immersion of water. Moreover, if the frost should be severe and the water begin to freeze, the watering must be discontinued, otherwise the whole surface will become one sheet of ice; and wherever the ice takes hold of the ground, it will undoubtedly draw it into heaps, which is very injurious to the plants.

The object of this early preparation of the meadows is to take advantage of the autumnal floods, which bring along with them a variety of putrescent matter, which is found very enriching to land. It is the chief object of the irrigator in those months to collect as much of this manure as possible, and, at the same time, to shelter the land from the severity of frosty nights; it is therefore requisite to use as much water as the land will carry without guttering. I believe it would be difficult to give land with a dry sub-soil, and considerable descent, too much water before the weather begins to get warm. It is necessary in those months that the meadows be inspected at least once in three or four days, to see that the equal distribution of the water is not obstructed by the continual accumulation of weeds, &c.

In February, more attention is required by the manager, for the grass is then beginning to spring; therefore, if the weather should be mild, and you suffer the water to run over the meadow too long without intermission, a white scum is generated, which is very destructive to the tender grass: so is frost, for if the water has been taken off so late in the evening as not to give the ground time to dry before the frost sets in, considerable injury will be done to the tender plants. To guard against the former of these evils, the water should not be suffered to run longer at each intermission than six or eight days; and to avoid the other, (the frost,) the water should always be taken off early in the morning, for if the land experience a drying day, the frost at night will do little injury.

In March, the same instructions must be observed as in last month, except where the climate will admit of spring feeding, as in the south of England, where the crop of grass is generally sufficient for any kind of stock in the middle of this month; therefore, in such situations, the water meadows must be made completely dry before the stock be admitted.

The latter end of March and the beginning of April are the most trying times in this climate to the tender grasses of an irrigated meadow, therefore every attention must be paid to the distribution of the water: it must be used more sparingly than in autumn or winter, not allowing it to run longer than five or six days at each intermission; and as the weather becomes warmer, two or three days at each time will be quite sufficient, until the end of May, when all watering for the season ought to cease, for the grass on all old meadows will shelter the ground at this period, so that the sun will have little or no effect on the roots of the plants.

Another particular reason why the watering ought to be discontinued at the above time, is this—when the water is suffered to run too long in the spring, after the grass has become thick and long, the water is apt to leave a sediment on the blades, which makes it not only very difficult to cut, but is very injurious to the hay. Above all, particular attention must be paid to make the whole of the ground quite dry; for should a small quantity of water be permitted to run to the lower ends of the beds, the grass there will lodge, and, before the remainder is ready for cutting, be half rotten; or a greater part of the finer grasses will be banished, for the reception of rushes and other aquatic plants. Want of due attention to this precaution and allowing the water to run too long, with imperfect draining, are the principal reasons why the water meadow hay is sometimes of less value than most other kinds.

The advantages of irrigated meadows.

The great object of agricultural improvement certainly is to raise the greatest possible quantity of animal and vegetable food for the support of human life. In this view, the introduction of the turnip and sown grass husbandry is justly considered as a most essential improvement; not only as affording a more plentiful supply of nourishing and fattening food during the winter and spring months, and preparing the land and tillage for bearing more plentiful crops of corn, but giving a greater supply of manure. Now, in regard to procuring an additional supply of nourishing food for animals through winter, early succulent food for spring, and more particularly in increasing the quantity of manure, as already observed in a previous page, water meadows may well be ranked as a most valuable improvement.

In what follows, I shall state what has occurred to my own observation in the course of my profession, as to the profit to be derived from water meadows in England and Sweden, but more particularly in Scotland; in which country, as already observed in the Preface, there is so much demand for additional supply of winter food for cattle, and so much facility of acquiring this supply by the establishment of water meadows.

I begin my statements with a few examples from England.

The proprietor of an old irrigated meadow, containing eight acres, in the vicinity of the village where I was born, (South Cerney, Gloucestershire,) disposed of the produce of it, in the year 1795, in a way that was well calculated to ascertain its real value.

In order to make the most of the spring feed, the grass was saved till the second day of April; from which time he let it to the neighboring farmers, to be eaten off in five weeks at the following rates:—a sheep, 10d. per week; a cow, 2s. 6d.; and a colt, 4s.:—one hundred and seven wether sheep, one week, £4 9s. 2d.: eight cows, £1 8s.: four colts, 16s.; three colts, three weeks, to be added, £1 16s. The whole produce of the meadow, £35 1s. 10d., or upwards of £4 per acre. The hay crop was, as usual, about fifteen tons, and was six weeks in growing.

But the reader will perhaps see the advantage of irrigation in a still stronger light, when he is told that this meadow, which was watered by the stream that drove a mill, and which, at the time of the foregoing statement, was occupied by a miller, was a few years before in the hands of a farmer who, living at variance with the miller, was entirely deprived of the use of the water for a whole winter, which unfortunately was succeeded by a very dry spring and summer; of course the spring feed was lost, and the whole of the hay crop of eight acres was only three tons.

An irrigated meadow of nine acres was laid out in 1802, by Mr. Smith, engineer and mineralogist, on the Paisley farm, near Woburn, belonging to his Grace the Duke of Bedford, and, in 1803, produced as follows:—in the month of March, the meadow was stocked with two hundred and forty sheep, for three weeks, at 6d. each per week, £18, making the spring feed worth £2 per acre. In June, mowed two tons of hay per acre, at £4 per ton, £72. August 20—again mowed one ton and a half per acre, at £4 per ton, £36. September 16—put on eighty fat sheep for three weeks, at 4d. each per week, £4; and then it fed lean bullocks, which are not reckoned in the account, producing £16 13s. 8d. per acre.

I conceive it unnecessary to refer the reader to more instances of irrigating grass land in England, but would rather advert more particularly to the benefits derived from the practice where we have not only an inferior soil, but all the vicissitudes of a northern climate to encounter, even where the ground is covered with snow and ice for several months in the year; but even there I hope to be able to show that the art of irrigation, when systematically attended to, is one of the greatest improvements to be found in the annals of agriculture.

In the year 1808, I was employed to survey, with regard to draining, a large tract of boggy land, belonging to Mrs. Grill of Söderfors Iron Manufactory, in the province of Upland, in Sweden. After having taken a general view of upwards of three hundred Scotch acres, I found about eighty lying nearest the large river Dal, coming from the province of Darcarlia, well situated for irrigation; and although there was nothing of the kind in the country previously to that time, the proprietress, at the first suggestion, determined, whatever the expense might be, to have an irrigated meadow formed, complete in all its parts; for she was confident that draining, in the first place, and afterwards irrigating for grass, would undoubtedly be one of the greatest improvements to a country, where the summers are so generally very dry, and, of course, hay very scarce.

The whole of this tract was reclaimed from the bed and overflowing of the above mentioned river, by a very expensive embankment, about sixty years before; but the drainage had been so badly executed, that what was not covered with water was a perfect bog, over which it was impossible for a person to walk without sinking up to the knees, which made the whole crop on eighty acres only eleven hundred and fifty stone.

Forty acres were formed into an irrigated meadow late in the spring of 1809, which injured the surface so much, that the crop was the same as it had been previous to the formation.

In 1810, the hay crop on forty acres was four thousand stone; within that year the other forty acres were formed into shape for a water meadow; and, in 1811, the hay crop on the whole was eleven thousand two hundred and fifty stone; in 1812, the frost damaged the crop so much, that the whole was only four thousand five hundred and fifty; and, in 1813, the crop was eleven thousand two hundred and fifty stone, but had not the frost on the 21st, 22d, and 23d June, very much damaged the grass, the crop would have been one-third more. The hay, since the commencement of the irrigation, is twice as good in quality, and I have not the least doubt, if the works are kept in proper repair, that the crops of hay and aftermath are double what they were at the time of the original publication of this account in 1814, at Stockholm, in the Annals of the Swedish Royal Academy of Agriculture.

The expense of forming this meadow, according to the value of our money, was three hundred pounds, or nearly four pounds per acre; by which it appears that, although the climate of northern countries is so very much against the practice, yet the improvement is one of the greatest that has been introduced into a district where it is impossible to procure manure for making improvements in any other way, and that wherever water can be brought to run over grass land, the benefit will richly reimburse any person for the money laid out. Since the formation of this meadow, several others have been made in different parts of the country with greater success, they being made on better land; which no doubt will, within a few years, diffuse the practice through the greater part of that country.

Irrigation in Scotland.

This species of improvement seems to have been formerly practised in several places in Scotland; in the parish of Dolphington, Lanarkshire, and in many places in Perthshire, traces are found of water having been carried over the surface of the ground, but as to when these were formed, there are no people living who can give an account. However, there is every reason to believe that the practice of irrigation never went farther in Scotland than a partial wetting of the land, until the year 1792, when my father, Charles Stevens, was engaged by the Highland Society to make a general survey through the principal parts of Scotland, with regard to introducing the practice scientifically.

After having traversed the grater part of the country, introducing irrigated meadows into Caithnessshire, Clackmannanshire, Peeblesshire, Perthshire, &c., my father was engaged by his Grace the Duke of Buccleuch, in 1788, to lay out and superintend the making of as many water meadows as should be found practicable, and at the same time advisable, on his grass farms in the south of Scotland—the tenants paying interest on the capital laid out. On these terms, several hundred acres were formed into water meadows, at an expense of from four pounds to six pounds per acre, which were regularly managed for several years; but the greater number of the tenants being forced into this improvement,* and grain, in the time of war, getting so very dear, the most of them thought it would be more advantageous to plough them up; but a few of the more enterprising tenants, being convinced that a crop of hay and the aftergrass would be of more benefit to them than any crop of grain they could produce, have been fortunate enough to keep their meadows entire. Although they are not so well managed as they ought to be, yet the crops are sufficiently abundant to prove that it was neither the quality of the soil nor poorness of the water that caused their failure, but the carelessness and bad management of the occupiers. To prove this assertion, I need only mention two or three meadows on his Grace's estate which are similarly situated, both with regard to soil and water, with the meadows ploughed up.

Kirkhouse meadow, in the parish of Traquair, contains nine Scotch acres, and was the first scientifically formed irrigated meadow in Scotland: the land, in its original state, was valued at 5s. per acre of yearly rent; the formation cost £4 per acre; but the hay crop for the last twenty years has averaged two hundred and sixty stone per acre, and the aftergrass 12s. per acre—making upwards of £7 per acre of gross produce. About the same time an irrigated meadow was made at Kirkhope, on the Ettrick, and another at Mount Benger Burn, on the Yarrow, which, according to the tenants' own account, pays them better than any piece of land of the same extent on their farms, although the land, in its natural state, was worth little or nothing.

I should think those instances of the advantage of irrigation, even in high pastural districts, are sufficient to put the utility of the practice beyond all doubt, and the public on their guard against any imposition.

On Lord Traquair's property, there are three irrigated meadows; two of them are so much neglected, that there is every reason to believe that they, in a very short time, will share the same fate with many of the Duke of Buccleuch's; but the third one, on Orchard Mains farm, of about twelve acres, which is tolerably well managed, gives about three hundred stone of hay per acre.

Robert Nutter Campbell, Esq. of Kailzie, commenced irrigating in 1797, by forming five and three-fourth acres of the lower part of his lawn into water meadow; the land, in its natural state, was worth £2 per acre of yearly rent, the formation cost £7 10s. per acre, and the average crop of hay for the last twenty years has been three hundred stone per acre, of so superior a quality, that several gentlemen prefer it to clover and ryegrass hay for their riding horses. It is generally worth 8d. per stone, and the aftergrass 20s. per acre, which makes the gross produce of the land £11 per acre. Mr. Campbell has another water meadow, eight and three-fourth acres, formed out of a perfect bog, only worth 5s. per acre before the formation, which cost £5 10s. per acre. It generally gives two hundred stone of hay per acre, worth 6d. per stone, and aftergrass 10s. per acre, making £5 10s. per acre of gross produce, instead of 5s. If the supply of water were more abundant, these meadows would produce considerably more.

The late Sir George Montgomery, Bart. of Magbiehill, in Peeblesshire, commenced irrigating in 1798, by forming about an acre into water meadow. This little experimental meadow turned out so productive, that the baronet continued operations on a larger scale, by collecting the small streams that ran through his property to aid him in procuring as much natural hay as possible by irrigation. He, therefore, in the year 1815, converted the lowlands at the Plewlands into irrigated meadows: they contain nine acres, and consist partly of boggy and partly of dry soil, worth £2 per acre in their original state. The effect of this improvement, for several years past, has been three hundred stone of very superior hay, per acre averaging 8d. per stone,* and the aftergrass 20s. per acre, which makes the gross produce of the land worth £11 per acre. Sir George has cut these meadows sometimes twice a year, but owing to the high climate, he found it more advantageous only to cut them once, and commence feeding off the aftergrass earlier in the autumn. The expense of making those meadows was £5 per acre.

In 1813, the Whitefield meadows were formed into bed-work; the greater part was so boggy that the miserable crop of grass was obliged to be dragged or carried to the surrounding high ground, there to be made into hay, which hardly paid the expense of collecting; but the land, since it was irrigated, is completely dry, and the crop of hay is of a superior quality, and is never less than two hundred and fifty stone per acre; which, at 6d. per stone. with the aftergrass at eighteen shillings per acre, makes upwards of seven pounds per acre of gross produce.

If those meadows were sufficiently supplied

*A little after the middle of last century, the late Adam Kennedy, Esq. of Romano, endeavored to introduce potatoes and turnips into the tenants' rotation of crops, by offering a deduction of one pound per acre from the rent for every acre under turnips and potatoes; but a scheme thus proposed by the landlord was suspected as tending to his own interest only, and the effect of the premium was extremely limited. However, when Mr. M'Dougal, from Roxburghshire, commenced his system on a farm at Linton in 1778, farming at his own risk, the system was immediately adopted universally. (See the Rev. Mr. Findlater's Agricultural Report of Peeblesshire.)

*The hay which those meadows produced in 1826 was sold by public sale as high as 1s. 4d. per stone of twenty-two lbs.

with water, although they are situated in a very bleak country without the least shelter, the crop of hay would be considerably more; they contain nineteen acres, and cost in the formation six pounds per acre.

Fallows meadow, on Sir George's large sheep farm, contains fifteen acres, was enclosed from moorland in 1816, and, by collecting the water from the surrounding sheep drains, five acres are partially irrigated, and the remaining ten are top-dressed with the manure made from part of the produce, which is consumed in winter by the sheep of the farm in a wooden shed near the meadow.

By this simple method of improvement, fifteen acres of common sheep pasture land give the proprietor from three thousand five hundred to four thousand stone of hay per annum, averaging 6d. per stone.* What an immense advantage to a sheep farm! By this simple process of enclosing and cutting a few small feeders and drains, the owner is enabled to provide food for his flock, when his less fortunate neighbors' sheep must either starve or be supplied from the farm yard; but I am afraid there are but very few sheep farmers who are so fortunate as to have any hay over and above what is requisite for stock at home.

Sir George fed the same number of sheep on the farm as he did before the meadow was cut off and enclosed; and I am fully persuaded that the same improvement might be made on almost every sheep farm in Tweeddale, for, in almost all of them, there are situations where five, ten, or fifteen acres might be enclosed and partially irrigated, as in every pastoral district there are numerous rills which might be easily collected and used to the greatest advantage at a very trifling expense; so that instead of being obliged, in snow storms, to send fifty thousand sheep to a milder climate of the southern parts of Dumfriesshire, (when the owners are obliged to be at the mercy of their southern neighbors, not to mention the very serious injury the flocks receive by so long and fatiguing a journey,) by adopting the above system of improvement, a considerable portion of the losses generally sustained would be prevented.

Sir Thomas Gibson Carmichael, Baronet, of Castle Craig, is another liberal promoter of this useful art. He commenced in the year 1817, by forming five acres with the plough and spade into regular bed-work. The land in its natural state was a complete peat bog, valued at 8s. of yearly rent per acre.

The formation was difficult, on account of the great number of deep peat holes, which were obliged to be filled, to bring the surface to a proper level. The expense of levelling and forming the beds was £6 per acre, the crop of hay in 1824 was four hundred and sixty-six stone (twenty-two pounds to the stone) per acre, valued at 5d. per stone, and the aftergrass at 18s. per acre, making £10 12s. 2d. per acre of gross produce.

Immediately above this, another meadow was formed, in 1819, into bed-work, containing seven acres; and, a little farther up the same stream, a third was made, in 1823, of the same extent with the last. The soil of those two meadows is partly clay and partly moss, with a thin covering of clay on the surface, the moss in many places being from four to seven feet deep. The whole is regularly laid into beds from thirty to sixty feet wide, at an expense of £4 per acre, and sown with Yorkshire fog, foxtail, and perennial ryegrass seed. The former of those meadows gave, in 1824, the same quantity of hay per acre as the five acre meadow, but of a superior quality; and the latter two hundred and fifty stone per acre, the greater part fiorin grass, *(agrostis stolonifera.)* Those meadows are irrigated by the little river Tarth, the water of which is superior to any water in the country, both with regard to richness, and being less subject to freeze than water in general is in high situations; moreover, the supply is abundant, which not only makes the management easy, but gives the proprietor considerable advantage over his neighbors. The aftergrass is generally worth 18s. per acre of yearly rent.

On my return from Sweden in 1822, the first irrigated meadow I was employed in making was for G. S. Menteath, Esq. of Closeburn, in Dumfriesshire. Mr. Menteath had commenced operations before my arrival, by levelling some inequalities in a field near his house, which was well suited for the purpose; but not having a person sufficiently skilled in the science of irrigation, Mr. Menteath availed himself of my assistance.

After having surveyed the ground, I found that a large range of meadows might be scientifically formed, so complete in all their parts, that, whatever capital might be expended in the formation, there could not be the least doubt of a good return in three or four years. The proprietor, having viewed the system of irrigation with that penetration which he exhibits in every branch of agriculture, was determined not to lose any time in forming, in the most accurate way, into water meadows, at any reasonable expense, those parts of his property which were contiguous to the mansion-house. To put this grand plan into execution, it was thought advisable to commence with forming a piece of land, lying immediately below the lime kilns, into bed-work. The water to be used being brought from a great distance to drive the machinery at the said lime kilns before it enters the meadow, and, in its course, collecting a considerable quantity of the finer particles of lime, its effects are truly astonishing. The first crop of hay, in 1824, which was of a superior quality, was four hundred and twenty stones per acre, valued at 8d. per stone, £14; the second crop, the same year, was sold to the neighboring people on the ground for £4 5s. per acre; and the aftergrass was valued at 15s. per acre—making the whole produce of one year £19 per acre. The value of the ground before it was irrigated was £3 per acre. The proprietor, thinking the beds of this productive piece of land too flat to receive all the advantage that irrigation is capable of imparting, has since been at the additional expense of £3 per acre for lifting the turf; and after having raised the beds in the centre twelve inches higher than the surface of the ground at the sides of the drains, has laid down the turf again. This is, undoubtedly, an excellent method, and will not only give the manager an opportunity of using more water in a given time, and thereby collecting

*The hay of this meadow was sold, in 1826, at from 1s. to 1s. 3d. per stone.

a larger quantity of manure, but, from preventing the possibility of stagnation, will prevent the growth of rushes and other aquatic plants. The expense of levelling and forming this meadow was £7 per acre.

The next operation was to form the lawn, containing twenty-five English acres, into catch-work irrigation; (plan 2.) which was done by making the feeders parallel with the slope of the ground, and equidistant from each other; the whole so arranged that not one of the works is seen from the house. As the greater portion of the ground was very unlevel, the most of the turf was lifted and the land ploughed, not only to facilitate the levelling, but to loosen the sub-soil, before replacing the turf. Amongst the numerous improvements made in the art of irrigation, loosening the sub-soil is one of the greatest; and I have not the least doubt, that by merely moving the soil, and laying the sod down again, it will make a great improvement on grass land of any kind.

The land of this meadow, before being watered, was worth £3 10s. per acre; the expense of levelling and formation, £5 per acre. The produce of 1824 was as follows:—spring feed for two hundred ewes and lambs, from the 7th of March to the 1st of May, making seven weeks, at 5d. each per week, £29 3s. 4d.; the crop of hay three hundred stone per acre, valued at 8d. per stone, £250; the aftergrass at 20s. per acre, £25—making upwards of £12 per acre. The quality of the hay is equal to that of any clover hay in the kingdom.*

Between this meadow and the first mentioned are two other meadows, composed of nothing but moss; indeed they are formed where the people formerly digged their peats. The one, containing nine and a half acres, is regularly formed with the spade into bed-work of sixty feet wide; and the other, eleven and a half acres, into a catch-work meadow. Their value, before being watered, was only 25s. of yearly rent per acre, but the average crop of hay since they were watered is two hundred and fifty stone per acre, besides aftermath. The expense of levelling and forming was £3 10s. per acre.

Mr. Menteath's views do not stop here, for he has other tracts of mossy land lying farther down the rivulet, of equal extent, and equally capable of being irrigated by means of catching the same water again. For this purpose, twenty-five acres have been levelled with the spade, and formed into bed-work meadow, and laid down with such grass as is calculated for the reception of water. Not only the last mentioned twenty-five acres, but twenty-one acres more of the Closeburn meadows, are composed of nothing but moss, which had been improved by means of levelling, paring, burning, and liming very strongly, and working it with the greatest possible care, before it was laid down to grass. But although the crop of grass, for the first two or three years, was tolerably good, it was not so great as might have been expected, compared with the expense that had been laid out on the land; for which reason the proprietor was determined to try the effects of irrigation, which last experiment has been most satisfactory, the land producing, since the application of water, double what it ever did before in its most productive state. Few people are aware of the great improvement grass land, composed of moss, is capable of receiving, by a mere wetting in dry seasons; for the greater part of improved moss gets so very porous, that the roots of the grasses are more exposed in dry weather than they are in any other soil; therefore, wherever water can be brought to run over the surface of grass land that has been lately reclaimed from moss, if only for a few hours at a time in dry seasons, the evil will not only be remedied, but a plentiful crop of hay and grass will be the result.

To obtain a sufficient supply of water for irrigating those extensive meadows, the proprietor has been obliged to make new water-courses, to bring the water from different rivulets, situated between three and four hundred feet above the level of the meadows, and at a distance of more than three miles.* These operations have been attended with considerable expense; but when we consider that, by these means, he has not only the advantage of a regular and abundant supply of water for winter irrigation, but is thus also enabled to give an occasional wetting to two hundred acres of other pasture land at pleasure, which is certainly of the greatest consequence to a property, such expense has not been misapplied.

I should by no means do justice to this interesting subject, if I did not mention that the proprietor's views, from the very commencement, were both winter irrigation of his meadows and partial wetting of his pasture fields; therefore, to be enabled to receive the greatest benefit from these streams of water, a field of twelve acres was levelled, in 1826, by lifting the turf; and, after loosening the sub-soil and levelling the surface, the turf was laid down again. The expense of this operation was £3 per acre; and, by means of a few catch-work feeders, the whole field can be partially watered at pleasure.

The proprietor is so confident of the superior advantage of this new branch of husbandry, that he is determined to prosecute the plan to a considerable extent.

Part of the water used in irrigating the above meadows, runs through a considerable extent of land which has been improved by the present proprietor from black or heathy ground, (moor pasture,) whereof eight hundred acres were pared and burnt; and the whole, with a large extent of other land, has been very strongly limed, which accounts, in a great measure, for the good effects of the water.†

William Loch, Esq. of Rachan, being desirous of having an irrigated meadow quite complete in

*The second crop of hay that was cut from these meadows in 1826, was sold for £4 10s. per English acre.

*To insure a full supply of water, for giving the meadows and pasture land a wetting in dry seasons, Mr. Menteath has made an additional reservoir, extending over more than fifty acres.

†Mr. Menteath is determined to prosecute the system of irrigation, on a scale of two hundred acres, on a property he has lately purchased in Ayrshire, lying on the north bank of the river Nith; for which purpose he has already agreed with the tenants for part of the land, for commencing operations with the plough, and laying the whole down in a regular form, which, when finished, will be the most regular and complete range of water meadows in Great Britain.

all its parts, requested me to survey such of his lands as were suitable for the operation. After taking the necessary levels of a field, lying on both sides of the river Biggar, it was found that by the straightening of the water-course where it enters the meadow, the water would have a greater rapidity; and by erecting a dam twenty-one inches high across the new cut, that not only this field of eight acres, but other lands of greater extent might be properly irrigated, without injuring the neighboring land. Having communicated this to the proprietor, he desired me to commence operations. The first operation was to straighten the water-course, (plan 1.) make the dam, and build the sluices, to admit the water into the meadow at pleasure; and, as the greater part was generally overflowed at every flood, to make an embankment on the west side above the dam, and another on the east side below, to protect the works and other fields of the proprietor. The land is partly composed of clay, with a gravelly sub-soil, and, in some places, mostly gravel both in soil and sub-soil. The surface was very unlevel, so much so, that in several places it was necessary to reduce it from ten to fifteen inches, to bring it to a level. The beds are formed for thirty to forty feet wide, with a rise in the centre of nearly twelve inches, so that every drop of water is kept in motion. The expense of cutting the river, making the embankment, building sluices, and forming the beds, was £9 per acre. The supply of water is quite adequate for the whole at all seasons, which very much facilitates the management; and the quality of the water is superior to any in the district. The superior quality of the water of the river Biggar for irrigating grass land, gives the proprietor a very considerable advantage over many who have not tried the experiment, both by producing a larger crop and finer hay; and although this meadow was made late in the spring of 1823, the crop of hay in 1825 was judged by the neighbors to be upwards of four hundred stone per acre, worth 6d. per stone; and the aftermath £1 per acre; making the gross produce worth £11 per acre, instead of £2 per acre, at which the land was valued before being irrigated. No expense was spared in the formation; indeed I flatter myself that this meadow is as complete a specimen as any in the kingdom, and have not the least doubt, if a regular management be carried on, that the product will be still larger, although situated in a high country.

Many large tracts of natural meadow land, lying on both sides of the river Biggar, in its present state of very little value, might be irrigated with equal advantage, if the proprietors would only enter into the spirit of it, which would not only be of the greatest benefit to themselves, but for the whole community, by not only taking away so much stagnated water, which is so injurious to the neighboring land, but by collecting many thousand cart loads of the richest manure, which is yearly precipitated into the sea.

There are upwards of fifty acres of irrigated meadow land on the Dolphington property, belonging to Richard Mackenzie, Esq. W. S. Several years ago the tenants on the said property commenced irrigating their grass land, the greater part of which was bog; and although the system practised has been very imperfect, it has given a considerable quantity of coarse hay. But the proprietor, suspecting the water might be used to much greater advantage by a properdrainage and formation, has been at a considerable expense, in conjunction with the neighboring proprietors, in straightening the river Tarth, to give a proper outlet to the surrounding boggy lands. By this means he has been able to irrigate eighteen acres in a regular manner, at an expense (including enclosing) of £8 per acre. The land in its original state was not worth more than 2s. 6d. per acre of yearly rent, the whole, excepting three acres which were covered with heath, being composed of moss from two to five feet deep, upon a bottom of fine sand. Although the heathy part was only made into meadow in 1824, the greater part of the heath is already gone, and the finer grasses now nearly cover the ground; indeed the whole meadow is so much improved, that a considerable portion of it gives upwards of two hundred stone of hay per acre per annum.

Townfoot meadow, containing about five acres, and belonging to the same property, has been partially watered by the tenant for several years, and in such places where the water ran freely off without stagnating, gave a considerable quantity of coarse hay; but since being properly drained, and regularly formed into beds, the hay has become infinitely finer.

These operations have diffused a spirit of improvement among the tenants, and instead of their carrying on the irrigation in the old slovenly manner, they have considerably improved the formation of their meadows, and are more attentive to the management of them.

In the spring of 1828, a small meadow was made by means of lifting the turf, levelling the ground with the spade and barrow, and laying down the turf again, at an expense of upwards of £20 per acre, which, in the same year, gave three hundred stone of hay per acre. Another meadow, containing four acres, was levelled at the same time, formed into beds, and sown with grass seeds, which would be ready for receiving the water in the autumn of 1829. And, lastly, Mr. Mackenzie was then (February 1829) busy in remodelling an old meadow, containing four acres, which, through bad management, had become a perfect bog. Some small patches of water meadow on the same property are cut several times a year, the produce of which gives a large quantity of manure to the other lands.

General Dunlop commenced irrigation at Southwick in Galloway in 1824, by forming ten acres with the plough and spade into bed-work meadow, and laying it down again with grass seeds best adapted for the soil.

Since that period the General has formed forty acres more into bed-work meadow, by means of lifting the turf, and levelling the surface of the ground with the spade and wheelbarrow, and laying down the turf again.

These operations, including making the large conductor, (which is eight feet wide in the bottom, and nearly a mile in length before it enters the meadows,) building sluices and bridges over the large conductor, making the small feeders and drains, with the expense of wheelbarrows, &c. cost £9 per acre.

The sub-soil is composed of very fine sand mixed with some very fine particles of clay, and the fine pores of the sand are filled with water, which causes the whole mass to run when worked in wet weather. The sub-soil being thus saturated with water, and there being no fall to drain it, the land is kept cold till late in the spring, thereby preventing spring food for ewes and lambs. In all other respects, the land and climate are well adapted for irrigation. Although these meadows are under peculiar circumstances, there can be no doubt of their success, if the same management be persevered in. To prove this, I will refer the reader to the following extract of a letter from the proprietor, dated 27th September 1818.

"I cannot furnish you with any account of the quantity of hay produced by my water meadows this season, not having been myself at home when the hay was made and the produce carried. I saw them, however, before they were cut, and the produce was very abundant indeed, where heights had not been reduced; where these had been lowered in order to preserve the level, the quantity of grass was comparatively small. I am, however, persuaded that both my first and second crop is at least double the quantity the ground would have produced had it not been watered; and I am the better able to judge of this, from having meadows adjacent to my water meadows of similar quality, but not irrigated, with which I can compare.

"The only point in which I have hitherto been disappointed, is in the earliness of the spring. The spring on my meadows is more backward than I had expected it would be; so much so, that hitherto I have seen no cause to expect they will ever afford me a valuable resource for feeding sheep in April, or even early in May."

I had the management of laying out a range of watered meadows for his Grace the Duke of Athol at Dunkeld, in the autumn of 1827. They contain thirty English acres, partly bed-work and partly catch-work. The land is mostly of a peaty nature, here and there mixed with a clayey substance. The field is divided into different divisions, forming distinct parts, which can be irrigated separately. The water that irrigates the first division is caught for irrigating the third division; what is used in watering the second division is caught again to water the fourth; and what supplies the third division is caught for watering the fifth portion: the whole being so arranged that all the water from the first four divisions can be caught to irrigate another range of meadows, which his Grace is intending to make at some future period.

The formation of those meadows is perfect in every respect, for every possible pains have been taken to make the most of the water; and, to accelerate the carrying away of the produce, a road is made through them.

The expense of formation, including sluices and bridges, was £7 per acre. The whole extent, in 1826, only gave a few hundred stone of hay; the crop of 1828 was four thousand stone, and had not the surface of the ground been so much broken under the operation of forming, a much larger crop might have been expected.

The soil of those meadows is so particularly well adapted for irrigation, that there cannot be the least doubt, if they are properly managed, that they will give at least three hundred stone of good hay per acre per annum, besides aftermath; and I venture to say, that if his Grace's meadows do not succeed, it will not be owing to any fault in the formation, soil, or water, but altogether carelessness in the management. In the autumn of 1826, Viscount Strathallan commenced irrigation, by forming fifteen acres, the greater part catch-work meadow, lying on the banks of the river Machany. The soil is partly alluvial and partly gravel beds, the overflowing of the river having washed away the greater part of the good soil; which made the value of the land, previously to its being watered, only worth from 20s. to 30s. per acre of yearly rent. About twelve acres are occupied by Messrs. John and Andrew Crawford, who pay interest for the capital expended. The crop of hay and grass, in 1827, was very good, but the crop of 1828 was very abundant and of the best quality, which was greatly owing to good management; for it is evident that if a water meadow is not well managed, the crop will not only be very deficient, but wherever the water is allowed to run at random, the grass will either be stinted in its growth for want of water, or will become coarse in those places where it has got too much and the greater part will be composed of aquatic plants.*

Neither of these extremities can be attributed to the management of those meadows, for the tenants pay every attention to them; indeed, if all water meadows were as well taken care of, there would be no occasion for complaint against the system; and instead of the practice creeping so slowly into the country, many thousand acres of barren soil would long ere now have been as productive as the best land in the kingdom.

An experimental water meadow was made in 1826 on the farm of Forr, near Crieff,† the pro-

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* I have since been favored with the following letter from the tenants:—

"*Ladystoun, 2d March*, 1832.

"Sir—According to promise, we send you an account of our water meadows, viz:—

"Ladystoun meadow, on an average of years, produces from two hundred and fifty to two hundred and eighty stones (tron weight) of hay per Scotch acre. The expense of keeping is about 5s. per acre yearly.

"Milnton meadow produces, on an average, from three hundred to three hundred and twenty stones. The expense of management about the same, and is still improving.

"The land is thus of a great deal more value to us, besides the advantage derived from having the earliest and latest cutting grass in the district.

We are, Sir,

Your obedient Servants,

JOHN CRAWFORD.

To Geo. Stephens, Esq. A. J. CRAWFORD."

†The following letter contains the sentiments of one of Lord Willoughby's tenants on the subject of irrigation:—

"*South Forr, near Crieff*, 24 *Oct*. 1828.

"Sir—As you are going to publish a second edition of your Essay on Irrigation, &c., I should neither do justice to you nor the system, if I neglected to acknowledge the great benefit I have received from the watered meadow you had the management of making on my farm, in the autumn of 1826. The crop of hay this year (1828) was upwards of three hundred stone per acre, besides a considerable quantity that was cut perty of the Right Honorable Lord Willoughby de Eresby. The land, previously to its being drained and made into a water meadow, was a perfect bog, having been the remains of the old bed of the river Earn. The drainage was accomplished by cutting a new water-course on the south side of the bog; which operation gave an outlet for the drainage of the whole farm.

The expense of levelling the surface of the ground, making the feeders and drains, and building the sluice to admit the water into the meadow, was twenty-four pounds, or about seven pounds per acre. The product of this little experimental field has been far superior, both in quality and quantity, to the tenant's most sanguine expectations, and, by careful management, there can be no doubt that it will be still larger. Another water meadow was made, in 1827, at Inverardran, the property of Alexander Smith, Esq. This meadow lies on the banks of the river Tay, immediately above Loch Dochart, and is watered by Inverardran brook; it contains about eighteen acres. The greater part, before it was drained and watered, was a perfect bog; and even now, in time of high floods, the whole is covered with water; but as that seldom happens except in winter, no injury is done to the crop. It is laid out partly in bed-work and partly in catch-work, at an expense of £7 per acre. The greatest value that could be put on the land previously to its being drained and irrigated, was fifteen shillings per acre per annum. The crop of hay in 1828 was calculated to be four thousand stone, in that district generally worth sixpence per stone, and the aftergrass seven shillings per acre, which will more than pay all expenses in keeping it in repair.*

A water meadow was made in the same year for the Earl of Mansfield at Scone, containing three acres, by means of lifting the turf, levelling the ground into shape, and laying down the turf again.

The crop of hay in 1828 was seven hundred stone of the best quality, besides a good crop of aftermath which was eaten off by sheep. As the supply of water is quite sufficient in all seasons, and the land well sheltered from the winds, there is every reason to expect a much larger return in future.

In 1827, I was employed by Hugh Rose, Esq. of Glastullick, to introduce the system of irrigation on his estates in Ross-shire and Sutherlandshire. On these estates three water meadows are made, and a fourth levelled and formed into bed-work, and sown with grass seeds, for the reception of water in the autumn of 1830. The largest of these meadows is at Dalmore, containing sixteen acres, the greater part composed of sand beds which have been formed by the action of the water, worth only five shillings per acre in its original state. To keep the surface of the ground as nearly as possible in its natural shape, it was necessary to form the beds the same way as the water left it, so that the whole is a specimen of irregular bed and catch-work meadow.

Any quantity of water that is necessary, can be admitted from Alness river by means of a flood-sluice which is erected for that purpose. The water, in time of floods, contains large quantities of peat and other substances, which, in a few years, will form a new surface to the sandy soil.

Arabella meadow, belonging to the same proprietor, and containing three acres, was formed by means of lifting the turf, ploughing and levelling the surface, and laying the turf down again. The third meadow, containing three and a half acres, was, previously to the formation, full of large stones, and the surface very unlevel; the reducing of it to shape was partly by lifting the turf and partly by the plough. The water used for irrigating it is all from springs which rise within the distance of a mile from the meadow; and, although it does not contain a large quantity of sediment, it seldom freezes, which is not the least advantage in irrigation.

Although most of these meadows are formed of the worst soil, yet, by a careful management, they have every appearance of doing well, for the Dalmore meadow already produces two hundred stone of hay per acre; and the advantage alone of the extra supply of manure, from five to six thousand stone of hay yearly, in a country where dung cannot be obtained for money, is not the least.

The late Elliot Lockhart, Esq. M. P. of Cleghorn, Lanarkshire, commenced irrigation some years ago, by means of cutting a few catch-work feeders across the ridges of a field that had been laid down to grass after corn; but the levelling of the surface had been so imperfectly executed, that the water had very little effect.

In 1827, the proprietor was at the expense of lifting the turf, and after having levelled the surface by means of the plough and spade, the turf was laid down again, and new feeders were cut for the equal distribution of the water. The effect of this last improvement has been astonishing, part of the meadow having given, in 1828, the amazing crop of five hundred and forty stone of excellent hay per acre at one cutting, which is the largest crop ever known to have been taken from any water meadow in Britain.* The remainder

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green, and given to the cattle in the house. The whole has been cut twice this season, and I am cutting part a third time. The second and third crops are worth more than what the whole rental of the land was, previous to its being watered. One great advantage of water meadows, is the extra quantity of manure it gives, without receiving any from the farm yard.

I am, Sir,

Your most obedient Servant,

ANDREW SHARP."

*I have been favored with the above communication by Mr. Black, the overseer at Inverardran, wherein he adds—"the crop this year (1828) was all cut in July, and by the 12th of August the whole meadow was covered with an excellent crop of aftermath of the most beautiful color, far surpassing anything of the kind in that part of the country."

*It is a singular fact, but not generally known to agriculturists, that by merely lifting the turf of an old pasture field that is overrun with moss, and by means of ploughing and loosening the sub-soil, and laying down the same turf again, the whole of the moss will disappear the first season, without applying either water or manure to the surface.

gave four hundred stone per acre at one cutting.

At Tarbax, in the same county, there are about twelve acres of water meadow, belonging to Norman Lockhart, Esq., partly bed and partly catch-work. The formation into meadow cost from four to six pounds per acre, the original value of the land per acre of yearly rent was from five to fifteen shillings, and the produce since it was irrigated, one year with another, is from two hundred to two hundred and fifty stone of hay per acre, besides the aftergrass, which is worth as much as keeps the works in repair.

At Cairnmuir, in Peeblesshire, there are two water meadows belonging to John Lawson, Esq.: the one, containing three acres, cost ten pounds in forming; and the other, containing one and a half acres, cost twelve pounds in forming: the former produces, one year with another, hay and grass to the value of thirty pounds, and the latter four hundred stone of hay per acre, besides aftermath, which is generally cut and given green to cattle.

A meadow of three acres, belonging to John Sanderson, Esq., at Romana Bridge End, not worth ten shillings per acre in its original state, has given, one year with another, since being irrigated, a thousand stone of hay, generally worth from fourpence to sixpence per stone.

Among the few farmers who have been particularly interested in promoting the system of irrigation, is James Murray, Esq., at Drochill Castle, Peeblesshire. Although Mr. Murray is only tenant of Drochill Castle farm, he has been at a considerable expense in forming ten acres into regular bed-work water meadow.*

The land was partly bog and partly arable. The boggy part was made into water meadow in 1825, and has produced large crops of hay and aftermath ever since; but the arable part did not receive the water till the autumn of 1827, and even at that time the ground was not properly covered with natural grasses, for which reason, the hay crop of 1828 was comparatively small. But, as the supply of water is abundant and the quality particularly good, even that part, in a few years, will become as productive as the former.

At Glenormiston, the property of William Stuart, Esq., in the same county, there are three water meadows, two of them containing about two acres each, watered by a small brook that runs through the farm yard, whose washings run into the meadows. The third meadow is watered from the Tweed, and contains six acres. The former of these meadows gave, in 1818, upward of four hundred stone of excellent hay per acre, but the latter considerably less, on account of the inferiority of the water and the impossibility of using it, except when at a certain height in the river.

As the land is all very dry, the hay is of a superior quality. What makes these meadows particularly advantageous, is the scarcity of natural hay and the want of manure in the whole district.

In 1827, I was employed to introduce irrigation into Wigtonshire. The largest meadow is at Dalreagle, on the river Bladnock, the property of Sir Alexander Muir Mackenzie, Baronet, containing nearly thirty English acres. It is mostly composed of peat to a considerable depth, and was, until a few years ago, overflowed by the water of the above mentioned river at every flood; to prevent which, the former tenant threw up an embankment round it, and made some partial drains, to free the surface of stagnant water; but as the embankment was never made sufficiently high to ward off the great floods, the improvement was neglected, and, on my arrival in the spring of 1827, the greater part of the bank being destroyed, the land had become boggy.

The first operation was to repair the bank, which cost £140; the next, to make the large conductor from the river to the meadow eight feet wide at bottom, through very hard ground, a distance of nearly half a mile, and build a flood sluice nine feet high, with hewn stone and lime; which operations cost £60.

The making of the feeders and drains, and levelling the surface of the ground, was the next operation, which cost £6 10s. per acre, or whole expense, including the reparation of the bank, £13 per acre. The value of the land previously to these improvements, was from 5s. to 15s. per acre per annum. The hay crop of 1828 was considerable, besides an immense crop of aftermath.

[To be continued.]

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*There is a particular account of this water meadow in the following letter:—

"*Drochill Castle, 24th Jan.* 1829.

"*Dear Sir*—Your letter of the 20th curt. I have been duly favored with, and lose no time in replying to the queries therein contained. I have irrigated, first and last, about ten Scotch acres of land, but as seven of these were only done last year, I can only speak of what I know the other three have produced; these last, as you know, I watered in the year 1825. The land previous to that time was a kind of meadow, and regularly cut every year, (what of it would cut.) but it was very unproductive; the quantity of hay, on an average of years, was, I believe, under a hundred stone per acre, and that of very indifferent quality. Since it has been watered, I conceive it has produced, on an average of the last three years, three hundred tron stone per Scotch acre, and of excellent quality. Perhaps the quantity in the year 1827 was under this a little, but the previous and subsequent years rather above it. I could assign no reason for crop 1827 being less than the other years, unless it arose from cutting the lattermath the year before; and if I am right in my conjecture, I would rather recommend pasturing than cutting of the second crop. I believe my second crop was well worth £1 10s. per acre, fodder that year being uncommonly scarce, which made it the more valuable; at an average of years, however, I could not calculate at above 10s. or 12s. As to the expense of my meadow, I, upon looking into my book, find it stated at £61 19s. for the whole ten acres I have watered, which comes to about £6 4s. per acre. As to my opinion of water meadows in general, it is decidedly favorable; and I would recommend it to every person who has it in his power to make the experiment, and he may rest assured that he will have no cause to regret it if the management be not neglected.

I remain your most obedient Servant,

JAMES MURRAY."

To Mr. George Stephens.

CULTIVATION OF COTTON ON THE PRAIRIE LANDS.

To the Editor of the Farmers' Register.

I think I closed my last letter to you, with urging the necessity of listing the lands intended for cotton the ensuing year. By that thrifty process all the stalks of cotton and corn, and all the offal of them, are placed in a deep furrow immediately under the crop to be grown. A plantation so prepared possesses these advantages:—All that grew on the land, and all its rubbish are placed out of the reach of impeding either hoe or plough in the working of the crop, and in such a position about the roots of the growing plant, that it receives all the benefit of the manure, and it gives a depth of soil immediately under the plant, that ought to make it bear a drought well. It has another advantage: you can plough up and make your beds in any part of the field that your land may be in order, and the rows will all fit to each other when the whole are done. There is yet perhaps, another advantage, though I do not speak of it with confidence—it is, in a great measure, a remedy for the rust. The rust is a disease that is increasing, and has done more injury than any one disease. I will mention three experiments I have made. In 1833, on such parts of the prairie as I suspected rust, I manured with cotton seed, and its effect was only to postpone the time of rusting. Thinking that the quantity used was too little, and its effects too soon gone, I manured the same ground more heavily in 1834, and it did not rust. This year the same lands have been manured again, and parts of the same with stable yard manure, and so far, there is no appearance of rust. I think stable yard and cow-pen manure on cotton, better than cotton seed, so far as a short experience has gone. So I think cotton seed is a better manure for corn. The reason for that fact will be found in the nature of the plant, and the manner of the action of the manure. Cotton seed is the most powerful in its action, and the quickest over in its effects. Corn is rapid in perfecting its grain, so soon as the bearing stage commences—which is at the time it commences to shoot and tassel. From that time, in one month the grain is ripe, and the manure no longer of use to it. Cotton seed is so short lived in its effects, that if it be rotten at the time the corn is planted, it will expend itself in giving growth to the stalk, and will be exhausted before earing. To make it suit the earing time, the seed should be killed after the corn is planted. I know this fact from so many trials that I am sure of it. It is very different with cotton; that bears fruit from the middle of June till frost arrests it, and those manures suit it best which are more slow and more continued in giving off their effects, which I believe to be the case with farm-pen manures, and which I know is not the case with cotton seed in the small quantities in which it is generally used.

On your listed lands you should scatter your manures after it has been lapped with the plough, and when it is ploughed into beds the manure will be generally mixed and incorporated with the earth in and about the centre of the beds. I think it too low when scattered in the furrow before laying the cotton or corn stalks, and also too low when on them before they are lapped. I think light manures will not sink into the earth, but will rise; and indeed that they are subject, like every thing else, to that law of nature which makes what is heaviest go down, and what is lightest, come up. You may scatter your manure in a trench in the tops of the beds after they are made up, but it will not be at so convenient a time, as to work, as before they are ploughed into beds, and it will be more apt to get within the influence of the evaporation of our powerful sun.

Your fields are now all listed; all that grew on them the preceding year has been turned under the earth, in the most suitable situation to secure it from evaporation, and for its beneficial effect on the intended crop. It is all rotting and becoming manure for you, while the winter's frosts are acting with more effect on the soil bared of its covering, and is ameliorating and improving it. Your next step, and that on which your success more depends than on any other, will be to throw your fields into beds so as to *dry* and to *warm* them. This can be well done by the mould-board plough, by breaking up your two first furrows deep and close upon the list, and by opening a deep furrow with a shovel plough in the centre of the old bed, now to be the new alley. This will generally give you all the height of bed wanted, with a little use of the hoe in drawing up in the lowest and wettest places. If your lands are very rolling, they may be dry enough without a bed, but there is no one plantation that lays so as to render them unnecessary in every field. Warmth of soil comes from drying, and drying comes from bedding. The listing should be done in the winter as early as your cotton is gathered, so that the prairie, naturally too loose, should have time to consolidate and become compact. The bedding you will scarcely ever have time to do before spring. I anticipate that some who have never tried listing and bedding, may think that it will make the land more liable to wash off. The prairies are very light and loose, and will wash under any and every circumstance I admit. The lands are equally liable to wash when ploughed, and they are to be ploughed equally whether you bed or not. If you intended to stop the wash in a small gulley in any place, you would either fill it with cotton stalks or bushes, and cover them—and this is what is done by listing, and so as to make each row carry its own water, and surely therefore you will not charge as a cause of washing, the very means you would use to prevent it. I have followed this practice for twenty years without thinking it liable to this objection—though my experience on the prairie is too short to speak with the confidence of knowing it.

Your next step will be to plant. As to the planting and covering, there are numerous ways, and each having some reason for its preference in the nature of the soil and the situation of the land. It would be tedious to enumerate them. I should open trenches on the prairies with an Indigo drill or a short bull-tongue plough, and scatter the seed in the trench, and cover with a board, long enough to rest across two beds at a time, with shafts pinned at right angles on this board, with handles to it like a plough. The mule walks in the alley and covers two drills at a time, and covers from 25 to 30 acres a day. The board covers and presses the earth down in the seed at the will of the ploughman. Where the trees and stumps are numerous, a hand or two must follow and cover near them. When very wet at the time of planting, your cotton will come well without covering—that is, the rain will coat the seed over for you.

The principal object intended by the bedding, was to dry the land where the seed is put, so as to secure an early rise of the cotton; and though in dry springs you may often get a good rise without bedding; yet it certainly makes it more secure, and the security is worth the additional trouble. I have seen a heavy shower of rain wash the seed up to a great extent, by washing out the gutter or trench in which it was planted, and I have seen it do the same with the plants. Now you are secure against this in a listed and bedded field, and if the alleys wash, as I admit they do, they wash fully to the same extent where you plough and do not bed.

Your cotton being up, there are various ways of tending it, in which good planters differ, though more I think in practice than in principle. I believe all agree in thinking that it is necessary to break up full and deep all the alleys, so as to give loose earth for the plant to push its roots into in search of food, and to lessen the labor to the hoes. That practice then is best, which best answers these ends. With these two objects in view, suppose you try a mould-board plough, and put the left hand or bar side to the plant as near as the list will let you, and throw the earth off, and with its return throw it back, and split out the alley with one cut of a shovel. The alleys will be completely broken, and the space left for the hoe will be so narrow that the hoes will have little to do. The hoes follow the ploughs, and chop through, taking the cotton, the grass, (if any,) and the earth off at one cut, leaving one, two, three, or more stalks in a place, and drawing a hoe full of earth into the same space, which earths the cotton, steadies it, and pushes its growth, and preserves the shape of the bed. The more usual practice here is, to chop through in the same way, but not to draw any earth into the space, or in any way, to the cotton. This is a point of difference between our best, as well as our worst planters. The advocates of one system say that no benefit is done to the plant by earthing it, and that without doing so, they get over more land in the day to the laborer, and can see better whether it has been faithfully done, as nothing is covered. The advocates of the other system assert, that the plant is materially benefited in its growth by having dirt drawn to it—that it is safer from death and from washing up; and though it takes longer, it is not at a time when there is any great press of work. As an advocate, I am incompetent to decide. I shall always put earth to the plant the first time, or while very young, and afterwards, when the press of work comes on, I shall only scrape off, and depend on the plough for the earthing. You see, I think, a good planter may sometimes get himself into a "scrape" without doing wrong.

After the first deep ploughing, the lime in the land becomes slaked by the penetration of the air into it, and also by the rains, and it is kept in so light, loose, and friable a condition, as to need no farther ploughings, except to destroy the weeds and grass that may spring up. Any plough that effects this object does your business, and the *broad sweep* that cuts 20 to 24 inches at a furrow is perhaps the best plough, as three times in a row will clean out the widest. It is a most faithful plough; it cuts every thing, and nothing escapes, and in a dry time in light lands is superior to any plough that I have seen—as it leaves on the surface all that it cuts; it may take root again in rainy spells, and when such set in, it is advisable to change them for mould-board ploughs, which will cover over all that they cut, and more.* This plough is a narrow root, or bull-tongue plough, with two wings 20 to 24 inches long and three and a half wide, standing in such position to it as to resemble the letter A, with the front edge sharp, and the back edge raised 1½ inches high. You can see a plate of a similar one in one of the early numbers of the American Farmer, furnished by Col. John Taylor of Caroline. You must cut off the heel and the snout, and substitute the bull-tongue to suit it to our rooty and stumpy lands.

All the workings of the crop after the first hoeing both for the plough and hoe is merely to kill grass and weeds.

Your working the crop closes when the cotton limbs generally touch each other across the rows, because at that time the working would break the limbs, and there are innumerable roots extending across and filling up the alleys which would injure by being then cut. If you have done faithfully all that is above directed, you have done your duty; the rest you must leave to Him who gives the increase.

I have thus, Mr. Editor, tried to point out to the new settler, and the inexperienced, how he should choose a plantation, and how, having chosen one on the prairie, he should make his winter preparations, so as to continue its fertility, and how to prepare to plant and to tend his crop; on each head I have tried to give him some of the leading reasons why he should do so. I consider it essential to a good planter that he should have a reason for for every thing he is doing, so that, knowing the object he has in view, he will use the means that are best calculated to effect it. Planters differ less in what they intend, than in the use of the instruments with which they effect their intentions. This letter has been spun out to an unreasonable length, and yet I could not be shorter, and say what I had to say.

A PLANTER.

Alabama, August, 1835.

SEA-WEED MANURE.

Fleets of boats, to the number of sixty or seventy, are daily arriving at Galway, with sea-weed for manure, from Cunnamara, Arran, and the county of Clare, which is purchased with avidity, and conveyed on carts all over the country, in various directions, even to the distance of forty or fifty miles into the interior.—*Galway paper.*

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*The mould-board ploughs that suit this purpose best are such as throw their furrow-slice the farthest, as our object is not how fine you can make the land, but how much grass you can cover. The mould-board should be wide, and so bent, as to be more at right angles with the cutting edge, than the usual cast-iron ploughs. They are shaped so as just to turn what they cut with most ease; we want a shape that will throw it far. We finish a row at three cuts that will require five with the ordinary cast-iron plough. The merits of a plough, by the standard of the dynanometer, is in the inverse of its merits for our use.

Extract from the Diary of a Blasé.

SPECULATIONS ON THE ANCIENT STATE OF THE EARTH AND ITS INHABITANTS.

Of all collections of natural history, the fossil department is, to me, the most interesting; there is room for speculation and reflection, till the mind is lost in its own wanderings, which I consider one of the greatest delights of existence. We are indebted to the vast comprehensive mind, and indefatigable labor of Cuvier, for the gleams of light which have lately burst upon us, and which have rendered what was before mere speculative supposition, now a source of interesting and anxious investigation, attended with results that are as satisfactory as they are undeniable.

That there was a period when the surface of the earth was almost entirely covered with water—a state between chaos and order, when man was not yet created, (for that then the world had not yet been rendered by the Almighty a fit receptacle for man,) appears to be undoubted. Yet the principle of life had been thrown forth by the Almighty hand, and monsters had been endowed with vitality and with attributes necessary for their existence upon an intermediate world.

These were the many varieties of the Ichthyosauri and the Plesiosauri, of whose remains we have now such abundant specimens—all animals of the lizard species, some supposed to have been supplied with wings, like the flying fish of the present day.

But imagine an animal of the lizard species, one hundred and twenty feet long—imagine such a monster—the existence of which is now proved beyond a cavil, by the remains, deeply imbedded in the hard blue lias rocks, and which are now in our possession. What a terrific monster it must have been! We look with horror at an alligator of twenty or thirty feet, but imagine an animal of that species extending his huge bulk to one hundred and twenty feet. Were they all destroyed when the waters were separated from the land, or did they gradually become extinct when the earth was no longer a suitable habitation for them, and no longer congenial to those properties with which they had been endowed when ordered into existence by the Almighty power? The description of the behemoth by Job, has long been a puzzle to the learned: we have no animal of the present time which will answer to it; but, in many points, this description will answer to what may be supposed would be the appearance, the muscular power, and the habits, of this huge denizen of a former world.

"His force is in the navel of his belly.
He moveth his tail like a cedar.
His bones are as strong pieces of brass.
His bones are like bars of iron.
He lieth under the shady trees in the covert of the reeds and fens.
The shady trees cover him with their shadow.
The willows of the brook compass him about."

It may be a matter of deep surmise, whether all animals were created as we now find them, and whether the first creation was final—how far the unerring Hand will permit a change to take place in the forms and properties of animals, so as to adapt them to their peculiar situations. I would say, whether the Almighty may not have allowed the principle of vitality and life to assume, at various epochs, the form and attributes most congenial to the situation; either by new formation or by change.

May not the monster of former worlds have dwindled down to the alligator of this—the leviathan to the whale? Let us examine whether we have any proofs in existing creation to support this supposition. We all know that the hair of the goat and sheep in the torrid zones will be changed into wool when they are taken to the colder climes, and that the reverse will also take place—we know that the hare and weazel tribes, whose security is increased from their color so nearly approaching to that of the earth in temperate latitudes, have the protection afforded to them when they are found in the regions of snow, by their changing to white—and we know that the *rete mucosum* of the African, enables him to bear the exposure to a tropical sun, which would destroy an European. But this is not sufficient, we must examine further. Sir Humphrey Davy has given us a very interesting account of a small animal, found in the pools of water in the caves in Carniola; this animal is called the *Proteus Anguinus;* it is a species of eel, with two feet; it is only to be found in these caves; it lives in darkness, and exposure to the light destroys it. Now, here is an animal which we must either suppose to have been created at the universal creation—and that is to suppose that these caves and pools of water have also existed from the time of the creation—or that the principle of vitality has been permitted, at a later date, to take that form and those attributes congenial to its situation: it is a curious problem. Again, it is well known that in the continent of New Holland there are animals who have a property peculiar to that continent alone*—that of a pouch or false stomach, to contain their young after their birth; it has been surmised that at one time the major part of that continent was under water, and that this pouch was supplied to them for the safety of their young; nor is this conjecture without strong grounds; if only the kangaroo and opossum tribes, which are animals peculiarly indigenous to that continent, were supplied with this peculiar formation, the conjecture would fall to the ground, as it might fairly be said that this property was only another proof of the endless variety in creation: but the most remarkable fact is, that not only the kangaroo and opossum, animals indigenous and peculiar to that portion of the globe, but that every variety of squirrel, rat, and mouse, which, in every other respect, are of the same species as those found in the other continents, are all of them provided with this peculiar false pouch to contain their young. Why, therefore, should all these have been supplied with it, if not for a cause? And the question now arises, whether at the first creation they had that pouch, or were permitted so far to change their formation, when the pouch became necessary for the preservation and continuation of the species. That these changes are the changes of centuries, I grant, and therefore are not likely to be observed by man, whose records or whose knowledge are not permitted to be handed down beyond a certain extent. Knowledge is not happiness; and when the accumula-

* The captain is out in his natural history; opossums are found elsewhere.—Ed. Port Folio.

tion has a[illegible] dangerous [illegible] benevolent [illegible] is but a drop [illegible]

A [illegible] other upon [illegible] termined [illegible] should follow each other.

All plants which are [illegible] carried from the ground [illegible] tend to render the soil less productive [illegible] language of farmers, to ex[illegible]

But plants which are su[illegible] are consumed by animals [illegible] they grow, do not exhaust [illegible] trary, the decay of the [illegible] plants, either naturally or [illegible] them by animals [illegible] sing organic matters to the [illegible] the elements of its fertility [illegible] imperceptible and slow [illegible] herself employs to [illegible] from what has been [illegible]

Sometimes [illegible] by the singular [illegible] of the decomp[illegible] which its [illegible] with this excep[illegible] vegetables upon [illegible] matters of the soil.

This is well [illegible] culturists. When [illegible] have been exhausted [illegible] ing away of its produce [illegible] down to herbage, in which [illegible] tation which it produces [illegible] tion upon the surface [illegible] powers of the soil. Land in [illegible] rest.

When land, however, has been [illegible] by successive crops, and has become full of weeds, the laying it down to rest in that state is attended with less beneficial consequences than when the soil has been previously cleaned of injurious weeds, and fertilized by good culture. In the former case, the process of renovation is slow, if perceptible at all; the useless plants increase, and not those which are beneficial and afford food to pasturing animals. Land, when properly laid down to grass, therefore, tends to recover its wasted powers of production. Land not properly laid down has [illegible] of this healing property, and may be more full of weeds and no richer when ploughed up again, after a time, than when first laid down. Under good management, however, the laying down of cultivated land to grass and other herbage-plants to be consumed upon the ground, is a means of resting the soil, and renovating its powers of production: and this mode of recruiting an exhausted soil being always at the command of the farmer, its application is important in practice. It is to be observed also that the poorer soils require this species of rest and renovation more than those which are naturally productive.

The experience of husbandmen from the earliest [illegible]

[illegible] that [illegible] of plants [illegible] exhausted [illegible] is carried [illegible] may be said [illegible] But [illegible] the same [illegible] is seen to be [illegible] plants ex[illegible] to the earth [illegible] which the plant is re[illegible]

[illegible] is suffered to ma[illegible] more than when [illegible] All [illegible] cut in their [illegible] have matured [illegible] when [illegible] seeds [illegible] same [illegible] but [illegible] upon the [illegible] of the [illegible] amongst [illegible] smaller [illegible] of [illegible] main[illegible]

[illegible] more its [illegible] of the [illegible] is carried [illegible] when consumed by [illegible] returned to the [illegible] plant had been cut down before [illegible] been in that state [illegible] Thus it is with the turnip [illegible] This plant is with us sown be[illegible] In the first season it forms a [illegible] and puts forth a large system of [illegible] leaves. Early in the following season it puts forth [illegible] which bears flowers, and the seeds [illegible] matured about midsummer. If this [illegible] plant is removed in the first stage of its growth, [illegible] it has put forth its large leaves and [illegible] consumed by animals, [illegible] but if it re[illegible] of its growth, then [illegible] and leaves returns [illegible] of the root [illegible] the flowers, and the seeds.

[illegible] that, in order to bring a [illegible] to its entire [illegible], by the [illegible] of its [illegible] a large quantity of the [illegible] matter of [illegible] it then when [illegible] When crops of [illegible] are [illegible] to arrive at maturity, [illegible] they are [illegible] exhausters of the soil on which they grow than when they are cut down while they are green; and if those seeds are in whole or in part carried off the farm, the crops are exhausters of the farm, as well as of the ground which had produced them. Were the ripened seeds to be wholly returned to the soil, it may be believed that they might give back to it all the nutritive matter which had been derived from it. But, in practice, seeds are employed for many purposes, and are generally carried off the farm which produces them. When this is done in whole or in part, the plants produced are in an eminent degree exhausters of the farm, as well as of the soil on which they have grown.

Further, certain plants, from their mode of growth and cultivation, are more favorable to the growth of weeds than other plants. The cereal grasses, from growing closely together, and not admitting, or admitting partially, the eradication of weeds, are more favorable to the growth and multiplication of weeds than such plants as the turnip and the potato, which are grown at a considerable distance from each other, and admit of tillage during their growth, and whose broad systems of leaves tend to repress the growth of stranger plants.

Having these principles in view, certain rules may be deduced from them, for the order in which the crops of plants in cultivation in a country shall succeed to each other on the same ground.

1st, Crops consisting of plants of the same or similar species, shall not follow in succession, but shall return at as distant intervals as the case will allow.

2d, Crops consisting of plants whose mode of growth or cultivation tends to the production of weeds, shall not follow in succession.

3d, Crops whose culture admits of the destruction of weeds, shall be cultivated when we cultivate plants which favor the production of weeds. And further, crops whose consumption returns to the soil a sufficient quantity of manure, shall be cultivated at intervals sufficient to maintain or increase the fertility of the farm.

And, 4th, when land is to be laid to grass, this shall be done when the soil is fertile and clean.

These rules may be applied to the plants which form the subject of common cultivation in the fields. In this country, the plants chiefly cultivated on the large scale are—the cereal grasses, chiefly for the farina of their seeds; certain leguminous plants, as the bean and the pea; plants cultivated for their fibres, as the flax and hemp; for their leaves, roots, or tubers, as the turnip, the cabbage, and the potato; and certain leguminous and other plants for forage or herbage. The plants of these different classes are yet to be described; and they are now only referred to with relation to the order in which they may succeed to each other in cultivation.

The 1st class of these plants consists of the cereal grasses. These are chiefly wheat, barley, oats, and partially rye. All these plants are in an eminent degreee exhausters of the farm. They are all suffered to mature their seeds, and are wholly or partially carried away from the farm. Further, from the manner of their growth, and mode of cultivation, they all tend to favor the production of weeds. For these reasons, and on the general principle that plants of the same or similar kinds should not follow in succession, the cereal grasses should not succeed each other, but should be preceded or followed by some crop, which either exhausts the soil less, or admits of a more perfect eradication of weeds.

2d, The leguminous plants cultivated for their seeds, as the bean and the pea, are all exhausters of the soil. They ripen their seeds, and these seeds are for the most part carried off the farm. Some physiologists suppose that they are less exhausters of the soil than the cereal grasses. It is probable that they do exhaust the soil somewhat less than the cereal grasses. But the essential difference between them, when considered with relation to their effect upon the soil, is, that, from their growth, and the manner of cultivating them, they are greatly less favorable to the production of weeds than the cereal grasses. By their broader system of leaves, they tend to stifle the growth of weeds more than the cereal grasses: and further, they admit of tillage during a great part of their growth. This is especially the case with the bean, which is therefore regarded as a useful cleaning crop, and so is cultivated in rotation with the cereal grasses, as a mean of preserving the land clean.

3d, Hemp and flax, which are cultivated chiefly for their fibres, and all plants cultivated for their oils, are exhausters of the soil. They are suffered to form and ripen their seeds and their stems afford no return of manure to the farm.

The next class of plants, from the large return of manures which the consumption of them affords, may be regarded as enriching or restorative crops, in contradistinction to the others, which may be termed exhausting crops:—

1. The turnip, the rape, and other plants of the cabbage genus, cultivated for their roots and leaves, and consumed upon the farm.

2. The potato, the carrot, the parsnip, the beet, and other plants, cultivated for their tubers, and roots, and consumed upon the farm.

3. The leguminous plants—the clover, the tare, the lucerne, and others—when cut green for forage, and consumed upon the farm.

The plants of the latter class, namely the leguminous, when mixed with gramineous, plants, as the rye-grass, are commonly termed the artificial grasses, but would be more correctly termed the cultivated herbage or forage plants. They are often suffered partially to ripen their seeds, and are made into hay; and in this case they follow the general law, exhausting the soil more than when used green. And when the hay-crop is carried away from the farm, they are to be regarded as exhausting rather than restorative crops.

In speaking of these different classes of plants, the following terms may be employed:—

1. The cereal grasses may be termed corn-crops.

2. The leguminous plants cultivated for their seeds, pulse crops.

3. The turnip, and other plants of the same kind, cultivated for their roots and leaves, may, with reference to the mode of consuming them, be termed green crops; or, with reference to the manner of preparing the ground for them, fallow-crops.

4. The potato, and plants of other familes cultivated for their roots and tubers, may in like manner, be termed green or fallow crops.

5. The leguminous plants cultivated for green food, as the lucerne and tare, may be termed green forage-crops.

And, lastly, the mixture of gramineous and leguminous plants cultivated for herbage or green feed, may, in compliance with common language, be still termed the sown or artificial grasses.

Further distinguishing these different classes of crops according to their effects upon the fertility of the farm, they might be divided thus:

1. Corn-crops—exhausting crops, and favorers of weeds.

2. Pulse-crops—exhausting,but cleaning crops, or capable of being rendered so.

3. Green or fallow-crops—restorative and cleaning crops.

4. Green forage crops—restorative, and sometimes cleaning crops.

5. The sown grasses—restorative crops.

Knowing these the general characters of the cultivated plants, we have, in devising a rotation, to cause the restorative and cleaning crops so to alternate with the exhausting crops, as that the land may be preserved fertile and clean. Further when we find that land cannot be sufficiently cleaned by means of cleaning crops, we must make use of the summer fallow; and again, when we find that land requires rest, we may lay it down to grass for a longer or shorter time, taking care when this is done that the land shall be in as fertile a state as circumstances will allow, and free of weeds.

Extract from the New York Farmer.

CLEAN WHEAT CATCHING THE DISEASE OF SMUT.

"A neighbor of mine, having purchased some very excellent seed wheat, the same was delivered in the farmer's bags of whom he had bought the wheat, with a promise that he, the purchaser, would return the bags immediately after the grain was sown or deposited in the drill. My neighbor complied with this request, and having drilled about half the quantity, from those bags in which he had received the wheat, he took opportunity on the following day, which day had been very wet and unfavorable for drilling the remainder, to empty those bags, in order that they might be returned. Thus was this excellent, clean, and till then unadulterated seed wheat, put into his (the purchaser's) own bags, which before had contained some very foul and *diseased smutty wheat*, as he, together with his farm servants, acknowledged the fact. On the third day the remainder of the wheat was drilled on the same soil, and in the same field, but not from the *clean bags* of the seller of the seed wheat.

"Now, mark the result at harvest. The clean seed wheat, which had been emptied into the farmer's own filthy smutty bags, produced about *one twentieth part of smutty ears;* whereas, from the former day's drilling, not a *single ear* of smutty wheat could be found."

For the Farmers' Register.

VIEW OF PART OF YORK, AND THE BACK RIVER LANDS.

The lands of York county, along the main road from Williamsburg, present a very general appearance of bad farming, and neglect of the valuable and abundant resources for improving the soil and increasing its products. There are some exceptions, particularly the farm of Judge Semple, near Williamsburg, on which much marl has been used, and most beneficially, as well as other manures. The road, as in most other cases in lower Virginia, is kept generally on the ridge between rivers or smaller streams, and of course, on land poorer than the average. There are farms on and near York River, of most excellent soil, and some improved to a high state of productiveness, and well cultivated. These however, are not in view on this route. Above Yorktown, the lands seen are mostly undulating: farther on they become more and more level, and in the lower part of the county, the surface is mostly so flat that it is objectionable, on account of not permitting the excess of rain water to flow off with sufficient facility. I was not enough acquainted with the country to know how much of it has marl beds of easy access: but it is certainly well supplied at several different parts along the road--yet there is for 20 miles the same general, indeed, almost total neglect and disuse of this manure. The character of their cultivation is such as might be expected from the disregard of the improvement of the soil. No where in our country can be found such valuable and cheap resources for improvement, and sure means for agricultural profits, combined with such general neglect of them.

In the vacant lots of Yorktown, and in the outskirts, I noticed a weed which was to me quite new, and which, from being confined within such narrow limits, seems to have been brought from abroad. It is of the thistle family, grows from one to two feet high, and has a flower of a brilliant and beautiful yellow color. The flower stands singly, and is more than an inch across. The leaves of the plant are shaped much like those of the common thistle, or the artichoke, armed with thorns at every point. The seed-pod is also covered with points. I learned that it is also found on the other side of the river, on Gloucester Point.

As flat as the lands are below, there seems to be almost no use made of bedding and water-furrowing, without which such land cannot possibly be kept dry. Extensive swamps are visible on both sides of the road, at some distance, which have been neither cleared nor drained, nor any attempt made (as was stated) to derive a profit from them, except by cutting out the best oak trees, to furnish timber to the neighboring fortifications, and for the navy yard at Portsmouth—which business has been very profitable in this low country. These swamp lands are rich, and not subject to any except surface water, with which they are soaked, and more or less covered in winter—and might be very easily and perfectly drained.

It appeared as a striking illustration of the general apathy of the people, and of the small desire for any means of deriving information, that not one post office was on this main mail route for the 24 miles between Yorktown and Hampton—nor did I see the stage driver throw out for any one in this distance, a way newspaper, or other periodical. Perhaps they are not worse off, for this privation, than other parts of the country where political newspapers are taken generally, and almost exclusively. By shutting out both the light and the darkness—the truth and the falsehood—which the party presses furnish—there is at least as much gained as lost.

For my accommodation, the stage took a different road for the last nine miles before reaching Hampton, which passes through the remarkable and valuable body of lands lying on and near Back River. I devoted parts of two days to an examination of this very interesting region, and receiving information of its character and mode of tillage, in the company of an old friend who is a successful and enlightened cultivator there, and whose opinions deserve great respect. This gentleman, Col. John Pryor, has promised me to prepare, and communicate to the Farmer's Register, a full and minute report on the Back River lands, if not of the whole of the little county to which they belong. My memoranda therefore of this remarkable and interesting region will be very concise, and present merely observations on such matters as are striking to a stranger, and might perhaps be passed over without notice by an old resident—or otherwise will consist of such "shreds and patches" of facts and opinions as might be deemed by others not worth distinct notice, or the trouble of being recorded. It is my object in these hasty memoranda, to note trivial matters—to present the mere *gleanings* of more important and valuable harvests which other writers either have before given to the public, or have ready secured in their minds, and *may* communicate for the public benefit.

The stranger will be first struck with the remarkable level surface of the whole body of Back River lands. They have but a few feet of elevation above the highest storm-tides—and on such occasions, much of the land is covered, which is firm and dry generally. This of course is a strong general objection, and cause of much injury to the lands which are sometimes inundated. The natural fertility of the whole body (of about 8000 acres) is great, and its permanency is abundantly proved by the wretched and scourging tillage which has been heretofore general, and still is practiced on most of the farms. The papaw, which is unknown in the high country, except on spots of rare fertility, or on the rich western lands, is here a common growth, seen in almost every waste spot. Though water may be reached by digging three feet in most places, and stands in the wells at only eight or ten feet below the surface, there is no difficulty in draining on account of springs. Surface or rain water is all that is to be guarded against, and the proper system of draining required, is simple and cheap. It consists in putting all the land in beds with a proper direction for their water furrows to be emptied in the ditches which are in the lowest places. The long and narrow bottoms, or slight depressions by which the storm-tides penetrate for great distances through the land, furnish admirable sites for these ditches, and great facilities for digging and keeping them open.

The soil is of three kinds, which are distinguished as the gray land, the black, and the brown or chocolate colored. The first is the most elevated and the least fertile—and the last is the most valued. It would be difficult to find any land richer than either of the two last kinds—and scarcely any more productive, when well cultivated, and in good seasons. But the low and level surface, the close neighborhood of water below, and probably other circumstances, cause more hazard here, and make the prospects of the farmer less sure than on some much less fertile soils. Corn is here the great crop—the most sure and the most productive. The soil (especially the brown) is very good for wheat also, being generally stiff enough—but the various disasters to which that crop is subject, render it much less sure and profitable. All the land is much mixed with gravel, and much of it below the surface has a quantity of rounded stones of various sizes, such as are seen on the river shores in the higher country. In one place, soon after entering this county, the surface of the road appeared much like that of a paved street, from the uniform cover of imbedded stones, about the size of those used for paving.

Below the surface, at various depths between two and eight feet, a bed of shell marl is so generally reached, as to be supposed to be almost the universal substratum of the Back River lands. This is a remarkable and important fact, if true—and may serve to account for the great fertility of the surface. The marl is nearest the surface of the brown and black soil—generally there within three feet, and often less. In whatever manner the surface earth was deposited by natural operations, and however poor it might have been originally, every tree which grew, must necessarily have pierced the marl with its roots, and brought up calcareous matter to form part of its body. All these trees require more or less lime—and all obtain some, as is proved by the contents of their ashes. For pines, the smallest supply of lime will suffice, and the presence of more is decidedly injurious—while the wild locust, the papaw, and some others cannot thrive except where the supply of lime is abundant. But every tree must draw up more or less—and when it dies and returns to the earth again its entire substance, all the lime which it had received is left on, and is ultimately mixed with the surface soil: and if the abundance and vicinity of the lime below offers an unlimited supply, this natural process must continue until the soil is as calcareous as is necessary, and as rich as that quality and putrescent matter in abundance will, together, certainly cause any soil to be. It may be objected to this reasoning, that the same process would have gone on wherever marl lies within reach of the deepest roots of trees—and that all the soil lying above should be thereby made rich, instead of exhibiting the natural sterility of most of such land higher up the country. The same effect is produced in many cases, and perhaps in every case where there is no barrier of barren subsoil between the surface and the marl. But where this barrier is found, as it generally is, and of from two to more than ten feet thick, it effectually stops the descent of the roots of such trees as delight in a calcareous soil—and those of pines, and other trees of like character in this respect, would not dip into the shelly earth below.

Black or native mulberry is a very common forest growth here, and on a field which had been cleared, (the second time) a few years ago, many young mulberry trees were left, to serve for fencing timber. Some of these are now entirely dead, and all the others in a dying or declining state. From this it would appear that the shelter of other trees, or a thick growth of their own kind, is best for their healthy growth. The fact is worth the notice of those who design to raise mulberry trees for silk worms.

Col. Pryor's crop of corn was planted entirely with seed of the "twin" or "prolific corn" obtained from Maryland, and of which, accounts have been given in Vol. 2 of the Farmer's Register, both by Mr. Carmichael and Mr. Garnett. Though planted late, it was then, (on July 8th) throwing out shoots, and sometimes showing three and four shoots to the stalk. On a newly cleared part of the same field, the planting was finished as late as June 23d—and in the rows which were planted a few days earlier (supposed June 20th) some plants were as high as my breast, when the leaves were raised. This remarkable luxuriance was however not owing to the kind of corn, but to the richness of the black soil.

The general opinion which I formed from my slight and hurried view, and the information gained during the same time in conversation, was, that there is no body of land in Virginia richer than this, or more capable of rewarding the outlay of capital and the judicious labors of the cultivators. But the general management, though greatly improved within fifteen years, and still improving, is yet very bad: and the labor which such soil would require, if judiciously managed, is made heavier by neglect, and its rewards diminished in proportion. Some of the best land (not under tillage) might have been bought not very long ago, under $10—and perhaps some such might still be found as low. A large proportion still remains to be cleared and drained—and a general operation of this kind, directed on a proper plan, and by combined effort, would greatly enhance the value of the land already under tillage. There is great disproportion in the prices of the land under cultivation, and such as is not cleared. The farm of Thomas Jones, esq., which is all cleared, and has no fencing timber, and scarcely any wood for fuel, was lately bought by him at $30 the acre—and though without buildings of much value, is certainly low at that price, though it is the highest yet given for any Back River land.

But however rich these lands are, and however much the labor of tillage might be lessened, and the general products increased, by better farming, there are two great objections to the country—in the swarms of mosquitoes which infest every cornfield and thicket through the day as well as night—and in the bad quality of the water furnished by all the wells: but neither of these evils appear to me to be past remedy. When the remaining waste and swampy woodland shall have been cleared, and the whole country drained as well as it is capable of, and as even regard to economy in labor would direct to be done, the mosquitoes will in a great measure disappear here, as has happened elsewhere from like changes. As to the water, there is no hope for improvement except by one means—and that holds out such promise of success, that it is strange that no where in all this low country, neither in the towns or country, the trial has been yet fairly made. I refer to the obtaining pure water by boring to great depths, as has been so extensively and successfully practised in Alabama, as well as in various parts of Europe. To the owner of every farm of 300 acres on Back River, an Artesian well of pure overflowing water would be a cheap purchase at $500—and to such a town as Norfolk, it would be well worth fifty times that sum. In Norfolk the experiment was commenced, but with means and arrangements so insufficient, that the boring was not carried deeper than 150 feet. If I were an inhabitant of the place, I would gladly pay my share of the expense of penetrating to 800 feet, if that depth should be found necessary. The experiment might fail, it is true, after incurring every expense: but none is better worth the risk. If it succeeded in any one place, it would show that the same valuable object might be effected any where in all the low country of Virginia, and perhaps of adjacent states. Even the Fortress is not supplied with well-water fit to drink, and resort is had there, as in Norfolk, to rain water collected in tanks. While the means proposed for procuring pure water are neglected in rich and populous towns, and in fortifications where the treasure of the nation is lavished for every thing else, it would be idle and ridiculous to expect the effort to be made by scattered individuals. But even in their situation, there is abundant inducement for a number to unite to bear the expense of a single experiment, the result of which would show what each one might venture for his own benefit.

To these two great evils of the Back River lands, I have not added the usual charge of unhealthiness, because it does not seem to be well founded, or more so than belongs to all our tide-water country. Whatever liability there is to bilious disorders would be removed in a great measure by a general and judicious system of clearing, draining and tillage. The country would be, no doubt, unhealthy at first (and even dangerous in autumn,) for new settlers from the upper country—but it seems quite the reverse for those who reside here.

There are particular as well as general causes, which it would be out of place here to treat of, which have concurred to depress this fine country—for which nature has done so much, and man has done so little. But, though slowly, there is a beneficial change now going on, caused by capital and cultivators being attracted from other places, as well as by increasing attention to improvement being every year given by old residents.

There is no part of Virginia where the repeal of our present law of enclosures, or change of state policy in that matter, is more necessary than on Back River—and the land holders with whom I conversed were fully impressed with that truth. Yet, as an illustration of the listlessness of the people of Virginia, not one here aided in any of the several movements for relief made in the last session of the General Assembly.

A GLEANER.

July 10th, 1835.

From the Silk Culturist.

CULTURE OF THE MULBERRY.

Eastwood, near Fredericksburg, Va.

SIR:—I feel deeply interested in the success of the silk business, particularly as regards this State, and beg leave to suggest to you the propriety of making a statement of facts, which I think would arouse the most indifferent.

I believe no statement in your paper has placed the net profit of an acre of land, well set in grown mulberry trees, at less than $100 per annum, and some writer has put it at $300. Now, can this be shown conclusively—or, in other words, are any of your various companies prepared to rent or purchase lands, well set in grown or five years old trees, at any thing like the above prices? If these queries can be answered in the affirmative, hundreds of our citizens who are now forcing their lands into market, to move west, at from $5 to $7 per acre, would be induced to remain and cultivate silk.

There is no agricultural staple in the world, as little liable to fluctuation in price, as *silk*. It will be at least fifty years before we can supply the home demand; and England must ever be an importer to an immense amount.

Now, sir, let me state one more fact, in regard to the *net profit* per acre *per annum*, in this State, of cultivated land. It is less than $6, and I am fully prepared to prove it.

Very respectfully,

J. B. GRAY.

P. S. I myself have gone largely in the business.

SOME ACCOUNT OF THE WILD HORSES OF THE SEA ISLANDS OF VIRGINIA AND MARYLAND.

Pharsalia, (Accomac,) 30th July, 1835.

To the Editor of the Farmers' Register.

Your favor of the 20th inst. I did not receive until nine days after its date, and during a period of considerable engagement. You will do me only justice, by attributing the tardiness of the reply to these causes, rather than indifference to your wishes. No enterprize, of a temporal nature, more deeply enlists my feelings, than the improvement of the agriculture of Eastern Virginia, and particularly of this interesting section of the state: and the man of science who voluntarily devotes his labor and talents to the accomplishment of an object so important to the best interests of our country, I would honor as an illustrious benefactor. The Eastern Shore of Virginia possesses physical advantages to the agriculturist and man of taste, rarely united in any other portion of the earth. Its climate is in bad repute abroad, and I regret my inability to give my testimony in favor of its salubrity. But the autumnal bilious, remittent, and intermittent fevers of our peninsula, depend upon causes, perfectly under the control of human skill and industry; and the period will come, when its general health will equal that of any other country in the same latitude. The inflammatory diseases of our spring and winter, are comparatively mild; and pulmonary and thoracick affections more rare than in any other more northern portion of the United States. There are more cases of coughs and dangerous colds, terminating in fatal consumptions, in one village of our northern and eastern states, in a single winter month, than occur in the dense population of our two peninsular counties in a whole year. While marshes and low grounds can be drained, the Eastern Shore has no reason to despair of a pure atmosphere; but industry must be excited into activity to accomplish so desirable an object. The marshes of Italy, and particularly in the vicinity of Rome and Naples, though exposed to a hotter sun, have injured the health of those populous cities but little, until within the last few years, when they have been neglected.

That the health of this shore is susceptible of immense improvement, my own experience furnishes abundant evidence. The gentleman who owned the farm on which I have resided for nearly twenty-four years, was forced to leave it, and seek a healthier situation. Every member of his family had been attacked with a dangerous grade of bilious fever, in August and September—and vernal intermittents—that surest proof of miasmatic poison, and a sickly situation—were frequent. This did not deter me from a purchase; for the source of this terrible contamination, I soon discovered, and instantly applied the remedy. I drained two pretty extensive ponds of half stagnant water, near the homestead, and half a hundred others more remote, as soon as I was able: and the consequence was, that during the whole period of my residence here, with a numerous family, not one case of spring intermittent has ever occurred, and but few fevers of any kind, and those yielding readily to the gentlest remedies.

But I am travelling, inadvertently, from the more immediate subject of your letter. If your agricultural work obtained a wider circulation here—to which it has the highest claims—I might occasionally offer some hints, that your superior judgement could improve, in a way to add to its merited popularity. Permit me to assure you, that I would, at any time, be highly gratified with an opportunity of furnishing a column or two of pleasant or useful matter for your interesting and patriotic journal; but the subject to which you have invited attention, will, I fear, disappoint my wishes.

The florid description which you have recently received of "wild horses" and "horse pennings" upon our Atlantic islands, was better suited to what they were thirty years ago—and indeed, before my knowledge of Virginia—than to their present appearance. The horses have been gradually diminishing in number, by neglect, until on one island, they are nearly extinct; and the rustic splendor, the crowds, and wild festivity of the Assateague horse-pennings, scarcely retain a shadow of their ancient glory. The multitudes of both sexes that formerly attended those occasions of festal mirth, were astonishing. The adjoining islands were literally emptied of their simple and frolic-loving inhabitants, and the peninsula itself contributed to swell the crowd, for fifty miles above and below the point of meeting. All the beauty and fashion of a certain order of the female population, who had funds, or favorites to command a passage, were sure to be there. All who loved wild adventure—whose hearts danced at the prospect of a distant water excursion, and a scene of no ordinary revel, where the ocean rolled his billows almost to their feet; all who had a new gown to show, or a pretty face to exhibit, who could dance well, or sing; belles that sighed for beaux, and beaux that wanted sweethearts; all who loved to kiss, or to be kissed, to caress, or be caressed; all, in short, whose hearts delighted in romance, without knowing its name, hurried away to this anxiously expected scene of extravagant jollity, on the narrow thread of beach that the ocean seemed, every moment, threatening to usurp. You can scarcely imagine, sir, the extravagant enthusiasm with which this exciting sport was anticipated and enjoyed. It was a frantic carnival, without its debauchery. The young of both sexes, had their imaginations inflamed by the poetical narratives of their mothers and maiden aunts, who in their more juvenile days were wont to grace those sylvan fetes, of the mad flight of wild horses careering away along a narrow, naked, level sand-beach at the top of their speed, with manes and tails waving in the wind before a company of mounted men, upon the fleetest steeds, shouting and hallowing in the wildest notes of triumph, and forcing the affrighted animals into the angular pen of pine logs, prepared to enclose them: and then the deafening peals of loud huzzas from the thousand half-frenzied spectators, crowding into a solid mass around the enclosure, to behold the beautiful wild horse, in all his native vigor subdued by man, panting in the toils, and furious with heat, rage and fright; or hear the clamorous triumphs of the adventurous riders, each of whom had performed more than one miracle of equestrian skill on that day of glorious daring—and the less discordant neighing of colts that had lost their mothers, and mothers that had lost their colts in the *melee* of the sweeping drive, with the maddened snorts and whinnying of the whole gang—all, all together, formed a scene of unrivalled noise, uproar and excitement, which few can imagine who had not witnessed it, and none can adequately describe.

But the play of spirits ended not here. The booths were soon filled, and loads of solid and liquid provision were opened, and fish and water-fowl, secured for the occasion, were fried and barbacued by hundreds, for appetites whetted to unrivalled keenness by early rising, a scanty breakfast, exercise and sea air. The runlets of water and the jugs of more exhilerating liquor, were lightened of their burden. Then softer joys succeeded: and music and the dance, and love and courtship, held their undisputed empire until deep in the night, when all sought shelter and repose on board of their boats, moored by the shore, or among their island friends, who gladly entertained them with characteristic hospitality. Many a winter evening's tale did the incidents of those merry-making occasions supply, and many a peaceful young bosom of retired rural beauty was assailed with other emotions than the rough sports of an Assateague horse-penning inspired: and from one anniversary of this half-savage festivity to another, all was talk of the joys and transports of the past, and anticipations of the future.

In regard to the origin of the race of our insular horses, there is no specific difference between them and those of the main land: the smaller size and superior hardihood of the former are entirely accidental, produced by penury of sustenance through the winter, occasional scarcity of water, continual exposure to the inclemency of the seasons, and the careless practice of permitting promiscuous copulation among them, without regard to quality. With respect to the supposed resemblance, on which you remarked in your letter, these horses are, in general, neither so sure-footed or hardy, or small, or active, as the famous Shetland pony; nor are their hoofs so well formed, although there are to be found among them numerous exceptions to this remark. All this may be readily accounted for from the operation of physical agents, the difference of climate, better water, long winters, and the localities of the soil on which they subsist. The interior of Shetland is mountainous and boggy, and abounding with wholesome water; and the more nutritive grass of the rugged mountains, inviting the little animals to feed principally upon those rough grounds, during their short summers, and occasionally in the latter part of spring and beginning of autumn, impart greater vigor and activity to their systems, and give them, doubtless, better feet. Assateague and Chincoteague islands are flat, sandy and soft, producing abundance of excellent grass, upon which they become very fat during the summer and autumn, notwithstanding the annoyance of flies, with which those islands frequently abound. But horses and cattle suffer for good water in dry summers and hard winters. Having no springs of running water, the animals which the islands support, depend for their drink upon ponds and glades, or small excavations made for the purpose, which are filled by the rains. These soon become putrid in our burning sun, are often dry in the summer, and freeze over in the winter, so as seriously to injure the suffering creatures, that have no other resource for this indispensable article. All this might be easily remedied by a little care and trouble; but insular habits are at enmity with systematic labor, or provident industry. Fishing, and shooting, and oystering, which yield immediate profit or subsistence, agree better with their indolent, temporary habits of living, whilst the slower and more remunerative profitable processes of agriculture, or rearing stock, are considered as servile drudgery.

The horses of Assateague island belonged principally to a company, most of whom resided upon the peninsula. No other care of them was required, than to brand and castrate the colts, and dispose of the marketable horses, all of which was effected at the period of their annual pennings, (June,) the whole, nearly, being joint stock. Their winter subsistence was supplied abundantly by nature. The tall, dense, and heavy grass of the rich flat lands, affording them green food nearly the whole winter, the tops of which alone were killed by the frosts, mild, as usual, so near the ocean. They never suffered for provender, except in very deep snows, with a crust upon the top, or when high tides were immediately succeeded by intense cold, which covered the marsh pastures with ice, both of which accidents were of rare occurrence, and very transient in their duration. Once or twice since my residence here (24 years,) the loose and spongy ice, formed from salt water, either lay so long as to injure the grass, or it was so entangled with the ice, that upon being suddenly carried off by a second north-easter before it had melted, it swept away, in its broken fragments, much of the food upon which the animals depended for their support. But I never heard that the scarcity thus produced, had any other effect than to reduce their flesh: no deaths occurred from that cause.

The wild gang of Assateague horses were secured by driving them into pens, made for the purpose, of pine logs. The horses seized in the pens, (by islanders accustomed to such adventures, who pushed fearlessly into the midst of the crowded herd,) were brought to the main land in scows, and immediately backed, and broke to use; their wild, and apparently indomitable spirit deserting them after being haltered and once thrown, and subdued by man. More docile and tractable creatures could not be found.

The price of these horses has been greatly enhanced of late. Thirty to forty dollars were estimated high prices, until within the last few years; some may still be obtained at these prices, but not of best quality—and at a sale of part of a joint stock, a few weeks ago, on an adjoining smaller island, (Morris',) several horses, that from some peculiarity of food, or better water, or superior and more recent origin—the latter I believe the efficient cause—had attained a larger size and more elegant shape, were sold upon the spot as high as from 60 to 70 dollars each. A considerable number may still be purchased on the islands—and some tolerably handsome—at prices varying between 30 and 45 dollars. I saw this week a beautiful little animal just bought by a gentleman from Jersey, at the latter price. The only peculiarity I have ever observed in these animals, is their predilection for salt marsh grass, which never deserts them, however long they may live, and however early they may be removed from their native pastures.

The catastrophe you allude to, did occur on Chincoteague island, of horses rushing into the sound, when indiscreetly attempted to be caught without pens, by driving detached portions of them upon narrow, projecting marshes; and some fine creatures were drowned. The practice is now abandoned.

I am perfectly assured that a small capital might be most profitably employed, by a man of enterprize, in horses, black cattle and sheep, upon these islands, if one careful herdsman could be procured. Pasture lands are extremely low. Since I have disposed of my real estate in Virginia, preparatory to a removal north, I have sold 200 acres of first-rate pasture land—part arable, a portion of a large body which I own upon the northern end of Chincoteague island, and affording the principal winter subsistence for the stock of the island—at 100 cents per acre. The remainder is still unsold. The largest and finest work-steers of the Eastern Shore, are raised upon these islands, without any expenditure for winter support; a proof that horses of full size, might also be reared there, with judicious attention to the breed, proper selection of stallions, and care to provide water. No other attention is necessary, except to watch the winds and weather about the periods of the equinoxes, when desolating tides are threatened, and to drive the stock upon high grounds, secure against inundation. Drovers from the North, purchase their cattle, and their horses always command a good price in the neighborhood. They are hardy, rarely affected with the diseases to which the horse is subject, perform a great deal of labor, if proportioned to their strength, require much less grain than common horses, live long, and are, many of them, delightful for the saddle. I have a beautiful island pony, who for fifteen years has been my riding nag in the neighborhood and upon the farm, who has given to my daughters their first lessons in equestrian exercise, and has carried us all many thousands of miles in pleasure and safety, without having once tripped or stumbled; and he is now as elastic in his gait, and juvenile in his appearance, as he was the first day I backed him, and is fatter than any horse I own, though his labor is equal, with less than two-thirds of their grain consumption. His eye still retains its good natured animation, and to one unskilled in the indications of a horse's teeth, he would pass readily for six or seven years old. My regrets at parting with this noble little animal, are those of the friend.

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Chincoteague island contains upwards of seventy families. One-third of their bread corn is raised upon the island; and the productions of the water, and occasional profits from disasters at sea, afford them an ample support. Assateague, though containing three or four times as many acres as Chincoteague, has but few inhabitants. It is unfit for the cultivation of corn, and has but little wood. Its rich, bent-growing lands, are subject to inundation during spring tides. The scenery around certain localities upon Chincoteague, are inexpressibly sublime and beautiful; and the view of the ocean and surrounding clusters of islands from the elevated sand hills of Assateague, directly opposite my house, would enchant you. To give you some faint idea of the extent of surface upon the two principal islands near me, I will just say, that Chincoteague is perhaps seven or eight miles in length, narrow at the two ends, and gradually widening in the middle to two or two and a half miles. Assateague is vastly larger. Nothing but the total prostration of all enterprize among us has kept these islands in their present unprofitable condition. Some hundreds of horses, cattle, and sheep, might be raised here, and annually sold, without one dollar of cost, except the expense of herdsmen, whose whole care and supervision would be confined to two or three objects—a supply of water—to drive the stock to high grounds when violent north-easters were threatened—(of the approach of which, sufficient premonitions are always given—) and to attend to the branding and castration of the young stock, at the periodical June pennings. The Hebrides of Scotland, so profitable to their proprietors, do not possess the one-hundredth part of the advantages of our Atlantic islands, for all the purposes of comfortable living and extensive stock raising; and yet they are stupidly neglected.

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T. HOLMES.

SPECULATIONS ON THE NATURE AND FERTILIZING PROPERTIES OF THE EARTH CALLED "JERSEY MARL," OR "GREEN SAND."

To the Editor of the Farmer's Register.

The contributions to your Register by Professor Rogers, on the green sand of New Jersey and Virginia, have afforded me, and I doubt not a large portion of your readers, much pleasure and instruction. It is gratifying to see men of science, thus bringing the stores of their learning to the aid of the practical concerns of life. By pursuing this course, they not only confer great and lasting benefits on mankind, but afford themselves the finest opportunity of gratifying an honorable ambition, by the almost indefinite extension of the sphere of their reputation and usefulness. A chemist may toil for years in his laboratory, wasting his life over his crucibles and retorts, and die and be forgotten. Or if perchance, he strikes out some new discovery, his name may be recorded in the annals of the science, and recited annually by professors in their introductory lectures; but so far as the great world of mankind is concerned, he is yet utterly unknown to fame. But let him once turn his attention to practical affairs—be no longer a man of speculation, but of action—and how soon the obscure philosopher is converted into a prominent public benefactor. His fame, no longer confined to mere men of science, in this reading age soon pervades society, and becomes emphatically *popular*. Why else is it that the scientific fame of Franklin and Davy is so much more extensively diffused than that of Priestly, Cavendish, Lavoisier and others, who, equally eminent among men of science, have yet failed to make any impression on the popular mind? The lightning rod of Franklin, and the safety lamp and *Agricultural Chemistry* of Davy, have so connected them with the common affairs of life, that they can never be forgotten; and each of them may be said with truth to have erected for himself a monument more durable than brass. The agricultural community has reason to congratulate itself that these splendid examples are not likely to be lost on the zealous and indefatigable professor of chemistry in the University of William and Mary.

Connected with the subject of the green sand formation, there is a most interesting inquiry but slightly noticed by Professor Rogers, to which my attention has been frequently turned, and of which I have yet seen no satisfactory solution. I allude to the remarkable fact, almost universally observed, of the disappearance of calcareous matter near the surface of our marl beds. I propose in this communication to offer some conjectures on the causes and effects, in an agricultural point of view, of the chemical changes which this deposite has evidently undergone.

So far as my information extends, this fact is always observed near the surface of beds of *blue marl*. The upper stratum consists invariably of what at first sight appears to be blue clay, but when more nearly examined is found to be composed principally of a silicious substance, through which are interspersed distinct impressions of shells, and numerous shining particles, (according to Professor Rogers) of *mica*, but which I take to be *selenite* or *pure gypsum*. I have occasionally found in these beds what at first appeared to be an actual shell fish, with both shells and the hinge seemingly perfect; yet so entirely destroyed was the hard substance of which it was originally composed, that it would yield to the slightest touch, and the application of the strongest acids could not detect the presence of the least portion of the carbonate of lime. What has become of this calcareous matter? This is an inquiry equally interesting to the geologist, and to the agriculturist, and it is surprising that no satisfactory solution of it has yet been given, or even attempted. In your *Essay on Calcareous Manures*, second edition, page 49, speaking of a deposite which had once been a bed of fossil shells, you say: "Not the smallest portion of calcareous earth can be found —and the gypsum into which it must have been changed, (by meeting with sulphuric acid or sulphuret of iron) has also disappeared in most places," &c.—and Professor Rogers in his article re-published in the Appendix to the Essay on Calcareous Manures, uses the following language: "Besides a considerable proportion of green sand, it contains, in addition to the crystalized gypsum, a notable amount of this substance in a sub-divided state, and seemingly occupying the place of the shells, which were formerly present, and have been decomposed under *the chemical agency of some substance which filtrated in solution through the mass*"—(page 115.) In the article on gypseous earth published by you in the Register as early as September 1833, the fact of the disappearance of calcareous matter from beds formerly composed of fossil shells is mentioned, and the difficulty of its explanation very clearly stated. That *sulphuric acid* is the agent in effecting this remarkable change, there can be no doubt; but whence is it derived? And what new combinations have been formed? These questions are not suggested by a mere spirit of speculative curiosity, but are of high practical importance, inasmuch as upon their solution depend the chemical character of this substance and its value, as a fertilizing agent, to the agricultural community.

In prosecuting this inquiry, I shall proceed on the supposition that the beds of *gunpowder marl* of New Jersey, containing the green sand, are similar to our beds of blue marl in Virginia; the descriptions given by Professor Rogers of the New Jersey deposites agreeing precisely with those that I have examined in Virginia. I take it for granted, also, that no accurate analysis has been made (because none is reported) of the substance called *gunpowder marl*, the analysis of Professor Rogers having been confined to one of its ingredients, the *green sand*.

The following theory, which I offer without any great degree of confidence in its correctness, is at least not destitute of plausibility, and is certainly strongly sustained by some striking facts connected with this deposite. Suppose the presence of *sulphuretted hydrogen gas*, generated by the decomposition of the animal matter of the shells, or of the fish originally inhabiting them. Or more probably, it may be an exhalation from the wet or marshy places, in which these beds are usually found. The writers on mineralogy in giving the geognostic situation of sulphuretted hydrogen, say that "it rises from sulphureous springs, also from marshy places, and is met with in mines"—or it may probably be produced by some chemical change effected in the earth with *sulphuret of iron*, or of *antimony*, from both of which substances chemists are in the habit of procuring sulphuretted hydrogen. But however generated, the existence of *sulphuretted hydrogen* gas, in the low ravines in which the marl beds are usually found, is extremely probable. This gas is composed of hydrogen and sulphur, in certain proportions. A small portion of sulphuric acid is also supposed to enter into its composition. It possesses decidedly acid properties, for it reddens litmus paper, and forms salts with alkalies. It is hence sometimes called hydro-sulphuric acid. (*Turner's Chemistry*, 252.) Its elements may easily be separated from one another. Thus, on putting a solution of *sulphuretted hydrogen* into an open vessel, the oxygen absorbed from the air gradually unites with the hydrogen of the *sulphuretted hydrogen*, water is formed, and sulphur deposited. (*Ibid.*) It seems therefore that the natural effects of the formation and disengagement of *sulphuretted hydrogen gas*, in a deposite of shells, would be these: the *sulphuretted hydrogen* coming into contact with the atmosphere, the oxygen of the air would gradually unite with the hydrogen and form water; sulphur would be deposited, and the sulphuric acid (of which the sulphuretted hydrogen is supposed to be in part composed.) would unite with the lime of the shells, forming sulphuret of lime, (or gypsum) and the carbonic acid would pass off in the form of gas. The result of this process in three distinct new formations, viz: *water*, *sulphur* and *gypsum*. This theory is sustained by the following facts.

1st. The presence of *sulphate of lime*, which has been ascertained to exist in most of these deposites, and is believed to exist in them all. The shining particles interspersed through them and designated by Professor R. as *mica*, are most probably *selenite*, or pure gypsum. I hazard this conjecture with great distrust, and would not venture it at all, if it appeared that these shining particles had been separately collected and analysed by him. The term *mica* was probably not used with reference to their chemical composition, but as its etymology imports. to indicate the shining character of these particles; particularly as he speaks in another place of one of these beds of Jersey marl being interspersed with *spiculæ of gypsum*. The order *mica* in mineralogy, is divided into eight genera, and a great number of species. the chemical composition of each of which is different. (*Ed. Enc. art. Mineralogy.*) And it is presumed if the elements of these shining particles had been ascertained by actual analysis, Professor R. would have communicated the result of the process.*

2ndly. The presence of *sulphur*, as indicated by the strong sulphureous odor emitted by this substance when gently pressed and warmed by the hand, and which together with its appearance, has probably obtained for it the name of *gunpowder marl*, and by the total destruction of vegetation occasioned by too large a dressing of it made in this neighborhood, supposed to be the effect of sulphur, which though highly beneficial in small, in large quantities is believed to be fatal to vegetation.

3rdly. From the remarkable fertilizing effect of the gunpowder marl of New Jersey, containing the green sand, and which can scarcely be attributed to the agency of that substance alone, thirty grains of which, according to the analysis of Professor R. contain of

Silica	15.51 grs.
Protoxide of iron,	7.56
Potash,	3.10
Water,	3.00

The most striking effects are said to have been produced by the application of five loads to the acre, of the *gunpowder marl*, containing, we will suppose, in the absence of evidence, 50 per cent. of the *green sand*. Now, according to the estimate of the author of the Essay on Calcareous Manures, of five or six bushels to the load, this would be an application of 25 or 30 bushels of the marl, or half that quantity of the green sand to the acre, which containing about 10 per cent of potash, (the only known fertilizing principle it contains) would make an application of $1\frac{1}{4}$ or $1\frac{1}{2}$ bushels of that substance, or its equivalent to the acre. As the effect of the *protoxide of iron* is entirely conjectural, I leave that out of the estimate. So great an effect, I apprehend, has never been attributed to so small a quantity of potash applied in any form. The green sand or "silicate of iron and potash," can scarcely be supposed capable in any manner of producing this effect. Green bottle glass being composed of impure materials, such as river sand containing iron, and the commonest kind of pearl ashes, may be considered a "silicate of iron and potash," yet we should scarcely attribute any great fertilizing power to that. We may hence conclude that the green sand is totally inadequate to produce the effects attributed to the gunpowder marl, and must look to some other of its ingredients to explain its efficacy as a fertilizing agent.

4th. That gypsum and sulphur are the principal active agents in the gunpowder marl, may be inferred from its remarkable efficacy on clover, observed in New Jersey by Professor Rogers and others, and by an intelligent gentleman in the county of Richmond, whose statements I shall subjoin. I have now before me three specimens furnished by this gentleman, with a view to their being transmitted to Prof. R. They all abound in the shining particles which I have supposed to be gypsum, and differ only slightly in color and consistency.

No. 1, which he designates as blue clay, abounding with impressions of shells, without any calcareous matter, he accompanies with the following statement: "In the spring of 1833, a small quantity of this was beaten fine, and put on young clover to see if it would act as manure. In a very few days the difference in size and color was very perceptible. In the spring of 1834 I gave the whole lot of clover a top dressing of this, (say 300 bushels to the acre) except 15 or 20 feet running through the lot. This I gave a heavy dressing of old ashes, a larger quantity than of the clay. The whole lot of clover was very fine, and I have never been able to discover any difference in the clover, or in the wheat now growing on the lot." Of No. 2, designated as yellow clay, though the blue color predominates, he says: "About 250 bushels to the acre were put on a poor sandy knoll last spring when the clover was sowed. During last summer's drought, it stood and kept its color much better than the lot adjoining, which had been manured with ashes, and the clover is now much greener where the clay was put." No. 3, green sand, corresponding very exactly to the description of the pure green sand of New Jersey. "A small quantity of this was put on about three feet square of very indifferent clover, about three weeks since, and the clover is now much greener, and at least six inches higher than that adjoining it. I suppose the quantity did not exceed two quarts." (Dated 12th of June.) The effect of gypsum on clover is too generally known to be now the subject of remark. But that the same effect has been attributed to sulphur, and proved by actual experiment, has not been so generally noticed, and is probably unknown to a large majority of agriculturists. M. Bernard, the author of a French treatise on the use of gypsum, an extract from which is published in the *Mem. of the Phil. Agr.*

*Professor H. D. Rogers of Philadelphia, in his "Guide to a course of lectures on Geology," states the fact that gypsum is found in the Jersey marl.—*Farm. Reg. Vol. III. p. 200.*

Society, Vol. II. 207, having observed the fertility of the lands in the neighborhood of Catana in Sicily, which abound in volcanic matter, was led to infer the vegetative virtue of sulphur. He caused brimstone to be pounded and sifted, and mixed with ashes, to render the sowing easy. "The effect was surprising on lucerne and clover, but little perceptible on wheat and natural grass." The experience of Judge Peters seems to afford some confirmation of this statement. If sulphur is so efficacious, the difficulty expressed by you, of accounting for the great efficacy of the gypseous earth on the supposition that gypsum was the only active principle of that substance, is at once removed.

5th. This theory receives some confirmation from the fact that these beds are invariably wet near the surface, where the water may be supposed to be formed by the union of the hydrogen of the sulphuretted hydrogen, with the oxygen of the air; and the shells are decomposed only to the depth of a few feet below the surface, to which depth the sulphuric acid in solution may be supposed to percolate.

6th. The blue or green color of this deposite is a circumstance in some measure confirmatory of the theory. "It is a property of sulphuric acid to dissolve a small portion of sulphur, whereby it acquires a blue, green, or brown tint." (*Turner's Chem.* 188.) The color of the marl may be occasioned by a combination of a small portion of the sulphur, deposited by the sulphuretted hydrogen, with a portion of the sulphuric acid supposed to enter into its composition. This may also possibly account for the fact of the change of the color of marl from yellow to blue, produced by putting it in a farm-yard, as reported in a note to the 2nd edition of the Essay on Calcareous Manures, page 69. The urine of the horses, &c. may be supposed to be the agent—for independently of the sulphuric acid which it contains in combination with soda and potash, it is supposed also to contain some acid in a free state, and also a minute portion of sulphur.

The result of this theory, if it be correct, is that the gunpowder marl of New Jersey, and the similar formations in Virginia, do not owe their efficacy entirely to the green sand, as has been supposed, but mainly to sulphur and gypsum, two powerful fertilizing agents. And as a consequence, most important to the agriculture of eastern Virginia, that the upper strata of our marl beds, containing the impression of shells, and heretofore regarded as comparatively worthless, are the most valuable portions of these deposites.

The correctness of this theory might be with certainty tested, or at least the truth of the proof adduced in support of it, by chemical analysis. And it may be asked why is this not done? To make a perfect analysis of a compound substance, such as the green sand or marl, is a task requiring a degree of care, patience, and scientific knowledge, to which few persons can lay claim. It is no difficult matter to analyze a specimen of marl, so as to ascertain the quantity of carbonate of lime contained in it; but this operation falls far short of a complete analysis, or resolution of any compound substance into its elements. All the analyses of marl, the results of which I have yet seen, have been confined principally to this object. A complete analysis of this substance is much to be desired.

In offering these crude conjectures to your readers, I beg to be understood as claiming for them but a small degree of confidence. I make no pretensions to the character of a chemist—all the knowledge I possess of the science having been derived from attending at a very early period, the usual collegiate course, and from such subsequent reading and reflection on the subject, as its intimate connexion with agriculture has induced me to bestow upon it. If this communication should have the effect of engaging for this interesting subject the attention of other gentlemen, whose greater knowledge and better opportunities for investigation, will enable them to afford more satisfactory information to the public, all that I desire will be accomplished. That the physical sciences are yet in their infancy is most obvious; and what we now vainly call philosophy, is but the alphabet of that universal knowledge, which, in the course of future ages, will be developed, by the energy and intelligence of man. Yet enough is already known by those who have studied nature, as far as her wonderful and mysterious operations have yet been explored, to enable them to impart to others much useful and interesting information. The cause of science, and the interests of agriculture and the arts, require that it should not be withheld.

WILLOUGHBY NEWTON.

Linden, (Westmoreland,) Aug. 12, 1835.

[It is gratifying that the inquiring mind of our correspondent has been directed to an important and interesting subject, which has in no respect been yet made clear—and which still needs better explanation than is furnished by the foregoing theory. It is hoped that others will aid in the investigation, and that satisfactory and valuable conclusions may be thereby reached. Having elsewhere given our early opinions at large concerning "gypseous earth," in the article referred to above, we shall now merely mention very concisely, a few facts, or deductions from facts, which seem to bear on Mr. Newton's reasoning.

The shining particles which Prof. Rogers called *mica*, and which are generally, if not universally seen in this earth, are not *selenite*. This would sufficiently appear from the correctness with which that gentleman would certainly apply the names of such very different substances presented in specimens under his examination. Long before we had ever heard of "green sand," or had seen a specimen of "Jersey marl," or had met with any person who was better acquainted with it, we maintained the identity of the latter substance with the "gypseous earth" of Virginia, and attributed the value of both (when there was any value,) solely to gypsum. But gratifying as it would have been to have had the proof which the universal presence of gypsum (or selenite) would have afforded, the rough modes of chemical investigation used seldom found that substance, which could not have been the case if it composed all the shining particles contained.

In the body of gypseous earth at Berkeley, sulphuret of iron was found—and in another body, a fluid containing sulphate of iron oozes out, and when dry forms a crust on the surface. Both these substances, if meeting shells, would decompose them and form gypsum—and thus, at least, would aid the process attributed above to sulphuretted hydrogen alone.

In many localities the upper layer of shelly marl has been changed as above described by Mr. Newton—and the shells, and every trace of calcareous earth removed. In addition to his experience on this head, in Westmoreland and the adjacent counties, we will name the marl beds of Henrico and of Hanover, where the same appearance is frequent, if not general. But in Prince George, near James River, there is no such change in the upper layer of any marl that we have noticed or heard of. The gypseous marl of Coggin's Point, (a very peculiar kind, described p. 43, Essay on Cal. Man.) throughout its whole extent, as exposed to view for more than half a mile along the river bank, lies *upon* gypseous earth (of unknown depth,) from which all calcareous earth has disappeared, but leaving abundant evidence of its former presence in the hollow forms of shells.

Many calcareous marls contain a little gypsum, which of course gives additional value and effect to the manure. But the *wet* beds can hardly contain gypsum—as even if it had been present at a former period, it must have been dissolved in the water, and carried off by the continual oozing.

We concur entirely with our correspondent in the opinion that the chemical analysis of green sand has exhibited no constituent part or parts, to which can be properly ascribed its remarkable effects as manure—and also, in considering these effects, precisely similar to those of gypsum. So far as our limited experience goes, the two manures act on the same kinds of plants, and of soils, and are alike totally inoperative under other particular circumstances. The direct effects of both are transient. Neither will be found valuable, (and generally have not the least effect,) on "*acid* soils," or those the most destitute of lime in every state of combination—and both become active on such soils if made calcareous. However, the green sand, to our own knowledge, has sometimes acted with greater energy than gypsum—and besides, we have yielded to Mr. Rogers' views our earliest impression, that gypsum constituted all the value of this earth. But highly valuable and important as are the effects of these manures, in aid of, and addition to, calcareous earth, there is no doubt of the immense superiority of the latter. Of course, green sand can never substitute calcareous manures, though it, (or gypsum in its place,) may indirectly, and in connexion with clover used as manure, serve to double the profit derived from calcareous manures alone.]

From the Farmer and Gardener.

CALCAREOUS SOIL FOR VINES.

Permit me to lay before your readers the following extract of a letter from Mr. Herbemont of SouthCarolina, the most successful wine maker in this country. The advice he gives on the application of calcareous earths to vineyards, is important; and comes with peculiar force and propriety from one of so much experience and so capable of profiting by experience. Let me add, that the wine made by Mr. Herbemont, is of very superior quality, particularly his white wine, which has been said by good judges to resemble the *Sauterne* very closely.

Yours,

G. B. S.

Extract of a letter from N. Herbemont, Esq. to Gideon B. Smith, dated Columbia, S. C. Sept. 25th, 1835.

"I am much obliged to you for the trouble you have taken, and the consequent information you give me relative to the culture of the grape in your vicinity. The last winter was the most severe one ever experienced here within the memory of our oldest men. It could not have been less so in Maryland. Our foreign vines were almost all killed down to the ground; but my Madeira, or, as you call it, the *Herbemont* and Lenoir stood it bravely. I am glad to learn that some of your zealous gentlemen do not despair of success. Perseverance is the thing, and I do not know an object more worthy of it. I beg you will tell such of them as you may see, that the more I read and reflect on the subject, the more I am satisfied of the propriety of manuring the vineyards largely with calcareous earths, fossil shells or marl, or lime, provided the latter is no longer caustic, using at the same time such other manures as rich vegetable mould or cow pen manure. The expense of this should be disregarded, and for the sake of economy a small extent of ground, say half or one acre might be tried first. What if it should cost one hundred dollars to put one acre of vines in proper condition, this would be nothing, if success is the consequence; for \$100 as the principal would then yield from 500 to 1000 gallons of wine, which at \$1 50 would be an interest not to be complained of."

Let me add, as one of the *reasons* for the application of lime in any or all of its forms, to vineyards, that it is supposed by experienced men, that lime protects the soil, and, consequently, the plants growing in it, from the effects of severe cold in winter and droughts in summer; and this, too, in addition to its other not so well understood properties of fertilization.

G. B. S.

From the London Mechanic's Magazine.

THE BLEACHING MANIA; FROM A LECTURE DELIVERED BEFORE THE CHELMSFORD MECHANICS' INSTITUTE; BY JOHN MURRAY, ESQ. F. S. A., &c.

Chlorine (from a Greek word signifying green) is the characteristic name given to a gas discovered by Scheele, in 1774, and called by him *dephlogisticated marine acid gas.* It was some time ago more generally known by the name of oxymuriatic acid gas, from a presumption (now considered to be erroneous) that it contained oxygen; and among manufacturers it goes by the name of the bleaching gas. The mode of obtaining it is very simple. We take black oxide of manganese and mix it with a small portion of muriatic acid, in a glass retort, and on the application of heat the chlorine is evolved. Either alone, or in combination with lime or magnesia, it may be, and is, employed for bleaching paper. I have no objection to its being used by the manufacturer in bleaching his linen and calico, but against the practice of bleaching paper I do protest. The consequences of thus using chlorine—which has the property of destroying ink and other colors—are, that many valuable epistles become illegible, and some have even dropped to pieces on the road. Some of our best modern books are already tottering on their shelves; and numerous deeds and valuable writings, requiring to be kept a great number of years, will, ere a very few, become useless. I have in my possession the remnant of a royal octavo volume, one of an edition of 30,000 copies, printed at the University press in 1818, and it is a singular fact, that there is not a perfect copy now existing. We find that when any thing of a delicate color is wrapped up in white paper the color is destroyed. A silk manufacturer once told me he could not preserve his colored silks; he used the whitest and cleanest paper he could procure to wrap them in, but the colors invariably faded, I told him for the future to wrap them in common colored, or brown, paper—he did so, and the silks retained their delicate hues. Paper stainers have lost hundreds of pounds in value, in consequence of the destruction of their goods by chlorine. This gas has also the property of dissolving gold. I knew a button merchant, who sent a quantity of gilt buttons to London for sale; being an expensive article, he took care to have them securely packed in white paper that they might be kept perfectly clean. The consequence was that the gilt corroded, and the buttons were returned unsaleable. Every thing now-a-days—such is the rage for bleaching—must be bleached. Our linen must be bleached, though by that means we render it yellow; our calico must be bleached, our ginger must be bleached, although at the expense of destroying the very principle which renders it valuable; and by-and-by, I suppose, we shall be bleaching our daily bread. Let us, however, view the case as we ought. If we have an inferior article, paper for instance, the fault is ours, not the paper makers.

We fix our prices, and if I am determined to have a quire of paper for 4d. the manufacturer knowing he cannot furnish it of sterling quality, is obliged to resort to the expedient of bleaching, for the purpose of giving a good exterior to a bad material. Perhaps the subject may be illustrated this way: suppose I want a pound of confectionary, I walk into the confectioner's, and say, "if you let me have it for 4d. I'll take it, and if not, why I can obtain it elsewhere;" never, for a moment, recollecting that the very materials, or perhaps merely the sugar, costs double the sum. The consequence of this mode of proceeding is, that we have the privilege of swallowing with our confectionary a sufficient quantity of chalk. To such a pitch has the bleaching of paper been carried, that government find themselves obliged to employ a person to watch the manufacture of the paper they require, for the purpose of securing it of a good quality. I know of two cases in which letters containing money have fallen to pieces by the road. One was directed to the post-master of Sheffield, and it so happened that the check was found in the post bag—the person for whom the other letter was intended, was not so fortunate. Every thing is now made up into paper, and in consequence of its being bleached, we do not so easily detect the inferiority. I have by me specimens of paper made not only from wood and leather, but from the bark of the willow, from hay and straw, potato peelings, wood shavings, saw dust; and in short, any thing can be made into paper, *such as it is.*

From the London Horticultural Register.

CULTURE OF THE CAULIFLOWER.

The ground on which the cauliflower plants are intended to be planted can scarcely be made too rich, therefore lay on a large portion of rotten dung, and dig it well in.

The best soil in which to sow the seed is one somewhat light, and for the first spring sowings rather rich; at all other sowings this is not material.

Always plant in open, airy situations, for the plants will never form good heads under the shelter or drip of trees; sometimes none at all.

The varieties known amongst us are only two, the early, and the late. The difference betwixt them is very trifling; the one called the *early*, has a slight purple or red color in its stalks, and probably is a little hardier than the other, and therefore is generally sown in the autumn, to preserve in frames or under hand glasses, for the first crop in spring.

Cauliflowers are raised annually from seeds, and are liable, like cabbages, to be impregnated by bees, &c., during the time of flowering.

There are three principal seasons for sowing, and all three require some little difference in their treatment.

First sowing season.—This continues from February to the end of March, and the plants are intended to succeed those sown the previous autumn. During this season, two sowings are usually made, one in February, and the other in March; both require precisely the same treatment, which may be stated as follows:—

Make a hotbed about two feet six inches thick, and as broad and long as may be necessary, for the seed intended to be sown.

When the bed is made, put on a frame, and cover it down with lights, to draw up the heat, and let it remain about a week to settle, which will reduce it to something less than two feet; then take off the frame, and level the surface of the bed nicely, and replace the frame again on the bed.

This being done, lay about six inches thickness of light rich soil, and on this thinly scatter the seed; sift a little soil over the surface, just to cover it. On the same bed, both radishes and celery may be sown, as they will interfere very little with each other by being mixed.

After the seed is sown, cover down the frame, and so let it remain, until the young plants begin to appear, which will be in a few days. Then give air, and in a few days afterwards remove the lights altogether, during the day, and merely shelter them at nights from sharp frosts, or heavy dashing rains. Or, if the frame be wanted for other purposes, it may be removed altogether, and the bed merely sheltered by hoops and mats.

If it is not convenient to spare a frame for the purpose, one may be made of turf walls, about eight inches high in front, and twelve at the back, and by laying a few bearers across, it may be readily covered with mats, or even hoops will answer the purpose very well. And should the cultivator not have the conveniency for making a hotbed, delay the sowing till March, and select a nice warm border facing the south.

When the plants have become an inch high, prick them out, about three inches apart, either on a warm south border, of light rich soil, or on another slight hotbed; and from this nursery bed, they will be taken to their final destination.

The second crop should be sown in the last week in March, either on a slight hotbed, or on a warm border, which answers the purpose exceedingly well at this time of the year.

The second sowing season.—The sowing at this season is to produce what are usually termed the Michaelmas crop of cauliflowers. This sowing should take place about the third week in May, and a shady border should be selected for the purpose; or if the weather becomes very dry, the plants will suffer notwithstanding all the care that may be taken in watering.

Prick out the plants, when large enough, as recommended for the early sowings, and allow them to remain there until the third week in July, when they may be transplanted into the situations where they are to form heads.

Third sowing season.—This season extends from the middle of August to the middle of September, and is intended to produce plants to stand the winter, and to plant out early in the spring for the main early crops, which are generally the finest. We prefer sowing this crop about the second week in September, because when sown in the middle or towards the end of August, they often become too large before winter, and are more liable to be injured by frost, unless they are checked in their growth, which often ends in their buttoning; that is, forming small heads very early in the spring, which, to say the least, is a very great disappointment.

Sow the seeds on a warm border in light soil, and when they are large enough, which will be about the beginning of November, transplant them in the situation where they are intended to stand the winter. This is either under a south wall, where they will receive no covering, under hand glasses, or in frames.

Where the cultivator has not a frame or hand glasses to spare for the purpose, they will do remarkably well if planted as close under a south wall as they can be placed; and if the weather be very severe, a slight shelter may be given them, but in general, this is unnecessary. These will not be quite so early in forming their heads as those in frames, or under hand glasses.

Planting under hand-glasses.—Prepare some rich ground, in a warm situation, for this purpose, by digging in a good quantity of rotten dung. Then place the hand glasses about four feet distant from each other, and proceed to plant from six to twelve plants under each, according to the size of the glass. If the day be dry when they are planted, it will be necessary to give them a little water; place on the glasses, and keep them close shut until they begin to grow; then raise the glasses on the south side, with a brick, to admit air in fine weather, being particularly cautious not to keep them too tenderly.

In fine mild weather, during winter, take the glasses entirely off all day, but in frosty weather, and very heavy rains, secure them well from being affected, otherwise in spring, most of the plants will be lost. They may be easily secured from frost by mats or litter, and from rain, by shutting the glasses closely down.

It is very possible, that in mild weather, towards spring, the plants will be infested by slugs; the evils resulting from these may be prevented by sprinkling quick-lime round each plant, or sowing it all over the ground amongst them.

Keep them sheltered by these glasses till towards the end of April, (continuing fully to expose them in all fine weather, and secure them from frosts) at which time they will have been thinned out to three or four under each glass, and those drawn out, have been planted in the situations appointed for them to produce heads.

Planting in Frames.—Place the frame on a south aspect, and in the beginning of November, or the end of October, transplant the cauliflower plants in rows, four inches apart, and three inches from plant to plant in the rows; place on the lights, and keep them close shut down, until they begin to grow, then give air in fine mild weather, as recommended before, for those in frames; but secure them from frosts by mats or litter.

A method we have practised at Chatsworth, for some years, may be safely depended on, for producing heads somewhat earlier than can be obtained by the usual mode of planting in frames. This is, by potting a number of fine plants in 60 sized pots, at the end of October, and plunging them in the frame, with the other plants. On the approach of spring, if these roots have filled the pots, it would be advisable to place them in layer; they will greatly outstrip the others in growth, and at the end of April, when they are planted out in the open ground, they will be a good size; and meeting with no check in their removal they will speedily form their heads.

Some persons keep the pots in a vinery, or other house, where a moderate heat is kept; we have tried this plan with success, but they are liable to button, after being turned out.

Final culture, &c. of the three crops.—The mode of final culture for all is much the same in substance, but differs in detail, in consequence of the seasons at which they are sown; so that it becomes necessary to treat of them separately. And first:—

Final culture of the first sowing.—In the beginning of May, prepare to plant them in their final destination, which must be on an open, rich, quarter of the garden, well manured for the purpose.

Take up the plants carefully from the nursery beds, with good balls, and plant them on the quarter prepared for them, in rows four feet apart, and two feet six inches from plant to plant in the rows.

If the weather be dry, water them as often as they require it; either with manured water, or not, as may be convenient; the former will stimulate the plants to grow finer.

The plants raised from the second sowing at, this season, should be finally planted on a rich north or north-east border, where they will produce heads from the beginning of August.

Final culture of the second sowing.—About the end of the second week in July, plant these, as recommended for the last, on an open quarter. Give them water as often as they require it, and they will begin to produce heads in October; and, if the weather be mild, will continue to do so throughout November and December.

Preserving during winter.—There are many ways of doing this, a few of which we will detail:—

Cut them on a fine dry day, strip off all the leaves, except those close to the head, and bury the heads under dry peat earth; this plan answers very well, for keeping them, but they become so filled with dirt that they rarely or ever can be got wholly free from it again.

Another way superior to the last, because they are not so liable to be dirtied, is to put them in boxes or small barrels, and bury them in a stock of turf, such as is used for burning. We believe this was originally practised by Mr. McIntosh, who detailed it in the Gardener's Magazine; this system, however, has its disadvantages, for the close confinement of the heads in boxes or barrels gives the vegetables an unpleasant taste.

They also keep exceedingly well buried in sea sand, perhaps better than in any thing else yet made use of; but they are liable to the objections made against the first system; namely, becoming filled with grit, which can scarcely ever be removed; and another obstacle presents itself here, sea sand cannot be obtained without greater expense in inland counties, than the value of the cauliflowers would warrant.

A system is mentioned in the Caledonian Horticultural Transactions, which consists in burying the whole plants out of doors. On a fine day, dig a trench close under a wall, wrap the leaves well about the heads of the plants, and place the plants head downwards in the trench; then lay the soil lightly over them, in a sloping direction from the wall, and smooth off the surface with the spade, that it may carry off the rain. This system, however, we can say little about, having never tried it.

Another plan often practised, is to draw up the whole plants on a dry day, and without trimming off any leaves, hang them up by the heels to the roof of a dry, airy shed: the only objection to this plan, is, that the heads lose all that beautiful crispness, and become flabby, and less pleasant to the taste.

Another, and a still better plan, is to take them up in fine weather, with good balls, and plant them in good light rich soil in a back shed, mushroom shed, or any other convenient place of the kind; and if kept free from dead leaves, they will soon form their heads in that situation, and be very good for table.

But the best method we have met with, where there is the conveniency, is to plant them in a brick pit, when severe weather comes on, and by removing the glasses in fine weather, and preserving them from foul, we have cut very fine heads, as good as could be grown out of doors, until the middle of February, when the winter was very severe.

Final culture of the third sowing.—About the middle of April, take up those plants with good balls, that have stood the winter under walls and in frames, and plant them in the situations appointed for them to form heads.

Take up all, except three or four of those remaining under hand glasses, and supply all deficiencies, about the end of March. Draw a little earth round the stem of each, give them plenty of air, by propping up the glass on the south side, and as the plants advance in growth, raise the glasses all round by means of bricks, and finally, about the beginning of May, remove the glasses altogether.

The crops will, therefore, come into use as follows:—

1. Autumn sowing for preserving through the winter.

a. Those potted, and preserved in frames, and finally planted under hand glasses, at the end of March, will produce heads early in May.

b. Those growing under hand glasses, either planted from the frames at the end of March, or having stood there all the winter, will produce heads by the end of May.

c. Those removed from the frames in April, to the open quarters in the garden, will produce by the middle of June.

d. Those sheltered under walls, and planted in open quarters in April, will produce by the end of June.

2. Those sown on a hotbed, in February, and planted out finally in May, will produce heads by the end of July or beginning of August.

3. Those sown on a warm border, in March, and finally planted out in May, will produce by the middle of August, or towards the beginning of September.

4. Those sown in May, and finally planted out in July will begin to produce in October, and continue through the winter.

Insects and diseases.—Whilst young, they are often destroyed by the ravages of slugs, and when grown to a large size, they are often infested by caterpillars, particularly those of the green-veined white butterfly *(Pontia Napi)* which secrets itself in the head, and is hard to be discovered, the turnip butterfly *(Pontia Rapæ.)* The cabbages brightline moth, *(Mamestre Oleracea)* and the common cabbage moth *(Mamestre Brassicæ.)* The only way of keeping clear of these is to hand pick them.

They are also infested with the larvæ of a fly, which causes the clubbing at the roots; many means have been adopted to prevent this, none of which, to the best of our knowledge, are efficient remedies. Charcoal dust has been found to have a good effect as a preventative, when spread over, and dug into the bed, and soot has been found to have a similar effect, but neither can be depended upon, at times.

RAIL ROAD PROPOSED FROM WYTHE COUNTY TO JOIN THOSE CONNECTING PETERSBURG AND PORTSMOUTH WITH THE ROANOKE.

Address to the Citizens of Virginia and North Carolina.

At a convention of Delegates assembled at Danville on the 5th day of October 1835, for the purpose of taking into consideration the projected improvement by a rail road from Evansham to Danville, and thence to some points in connection with the improvements to the Roanoke—among other proceedings the following resolution was adopted.

'Resolved, That a committee be appointed to prepare an address to the citizens of Virginia and North Carolina showing the practicability and importance of the proposed rail road.'

In pursuance of the duty devolved on them by the foregoing resolution, the undersigned beg leave to offer to their fellow citizens of Virginia and North Carolina, the following facts and considerations.

An inspection of the map of Virginia, as connected with her southern and south-western boundary, offers at a glance to the eye of the examiner an immediate and direct communication by the channel of the Roanoke, between the great south-western valley, and our Atlantic border. A rich and expanded area of the surface of Virginia, embracing not less than ten thousand square miles, with a population of one hundred and eighty thousand souls, a wide extent of the territories of Tennessee and Kentucky and the richest portions of our sister state of North Carolina, embracing of her population one hundred and sixty thousand souls, seem at once connected by the ties of a common interest in this common channel of commerce, which want of energy or want of resources in our people has hitherto left unimproved. It behooves us now to exhibit to our fellow citizens the facts and calculations by which we ourselves have been irresistibly drawn to the conclusion that the removal of all obstructions to the free enjoyment of that channel and of the rich fruits matured by the increased activity and energy which such an improvement must infuse into all the operations of our people, is practicable; is within our immediate resources; and is promptly and urgently called for, by every consideration that can influence men determined to avail themselves of the great blessings which nature has scattered around them, with a lavish hand. The experience of a few years, yet ample in that time, the eminently successful experiments made in Europe, on our continent and even in our state, demonstrate the superiority of rail roads over all other improvements. Where nature has furnished, free of expense, a direct and continuous channel of navigable water from the interior to the seaboard—such improvements may not be required. But that mode of communication is denied to us, and accordingly the Convention has determined on an immediate survey of a route for a rail road from Evansham in the great valley of the south west, to some points in connection with the several rail road improvements to the Roanoke. Is the contemplated work practicable? We assure our fellow citizens that every means of obtaining information, short of an actual survey of the specific route has been resorted to, and we are prepared to assert that it is not only practicable, but in our opinion, presenting fewer obstacles to its accomplishment than any known work of the same extent, on the continent of America.

Which ever route may be ultimately selected between the eastern and western limits of the contemplated improvement, the distance cannot far exceed a line of two hundred and ten miles.

Of that extent one hundred and sixty miles at least must be in a champaign country, along the valley of the Roanoke, resembling in its general features that country in which the rail roads already completed and in progress, are located; differing however in some important particulars, in the increased fertility of the soil and consequent cheapness of provision on this route, and still more in the greater abundance, cheapness and accessibility of all the materials for the construction of the work. Of the remaining fifty miles, six may be taken, as a large estimate for the mountain section, which has hitherto alarmed the timid, and presented an obstacle even to inquiry. Let us approach it undismayed, and how insignificant does it appear? There is no person acquainted with the features of our mountain scenery, that has not observed how much lower is the general swell of the mountains, constituting the boundary between Franklin and Patrick on the one side, and Floyd and Grayson on the other, than along the same range northwardly.

Over that range, at some point, the route must lie, innumerable gaps and gorges offer favorable locations for roads of every kind, and the observations of the practised hunters of these mountains assure us, that there lies in the contemplated line, a gorge offering a route with slight exceptions, already graduated by the hand of nature. But suppose the intervening hills as stubborn and impracticable as those which the enterprise of Pennsylvania has tamed to her uses, suppose them presenting as much difficulty as those in the way of the once contemplated rail road from Lynchburg to New River, are they such as to deter us from this great enterprise?

The report of Col. Crozet on this subject made to the board of public works 26th December 1831, furnishes the following details applicable to our case:

Over Buford's Gap the highest rise on the rail road, is	75 feet per mile.
The highest estimate of expenditure per mile contemplating granite sills for the section is	$14,000 per mile.
The highest average expenditure on the whole route from Lynchburg to New River is	$11,000 per mile.

Let us then suppose as many difficulties in our route as the State Engineer reported, to offer themselves in the route from Lynchburg to New River, the greatest difficulty which he should encounter, would be an elevation of 75 feet per mile over a section of six miles, and that wholly in favor of the heavy traffic: and the greatest average expenditure on a section of fifty miles would be, $11,000 per mile. With these facts we can no longer doubt the practicability of the work at a moderate expense. We entertain no doubt however, that the estimate and surveys of an experienced engineer will bring the expenditures and difficulties far within this admission. Assuming then the estimates of Col. Crozet for a more difficult route, the upper section of our work embracing a line of fifty miles at $11,000 per mile would cost $550,000

The lower section, taking the highest combined average of the Petersburg and Roanoke, and the Portsmouth

and Roanoke rail roads predicated on actual expenditures, would be $8,000 per mile, making for one hundred and fifty miles the sum of	$1,200,000
presenting an aggregate expenditure on the whole of the proposed route of	$1,750,000

Allowing then for every contingency and the most unfavorable result of the surveys, it may be safely asserted that the round sum of two millions of dollars would cover the whole expenditure on the contemplated work.

Is that a sum within our resources? Is its magnitude such as to deter us from the prosecution of an enterprise, pregnant as we believe it is with blessings inestimable to so large a portion of our people? Upon this part of the subject no observation of ours can be necessary.

In times like these of unexampled prosperity, when so large a portion of capital in every part of our wide spread confederacy is courting a profitable investment, it can only be necessary to show that ample returns must reward the investment to insure the application of the estimated sum to any contemplated work.

By a reference to 'the synopsis of the James River and Kanawha Improvements, &c.' we find the amount of tonnage on the south western route, embracing part only of that region which must inevitably seek our improvement as the cheapest and most expeditious, estimated at [illegible] tons. Of this by far the largest portion is now carried to Baltimore at an enormous expenditure of time and money. The time ordinarily occupied by a wagon in travelling from Wythe court house to Baltimore may be estimated at fifty days, while on the contemplated rail road the rich productions of the valley may reach Norfolk, Petersburg or Richmond in two days, or the Baltimore market in three. Taking then as the basis of our calculation the report of the state engineer confirmed by the report of the Abingdon Convention, as set forth in the synopsis above referred to, we may estimate the immediate trade meeting this improvement at Evansham as yielding a tonage of 100,000 tons.

To this add the trade of the counties east of Wythe in Virginia and North Carolina bordering on the proposed road, which on the fairest principles of calculation known to the committee may be estimated at	50,000 tons.
The aggregate amount of tonnage now anually seeking its destination by wagons, and other means of transportation is	150,000 tons.

From this calculation are excluded the vast mineral resources on the immediate line of the road. The salt, lime, gypsum, iron and lead, the three last sufficient to supply every possible demand, in fact, inexhaustible, yet according to the report of the Abingdon Convention, which valuable document we beg leave to recommend to the attention of the public—"The transmission of mineral productions of south western Virginia and East Tennessee, would form the largest source of profit to the stock holders of the rail road company." Add to all these the continued stream of travel which now runs through the southwestern valley, and which, as certainly as cheapness, comfort and expedition invite the steps of the traveller, would mainly be diverted to the projected route, and the revenue of the road would swell to an amount which this committee would feel reluctant to indicate. Here we reach the great thoroughfare to the south and southwest. Since January last not less than thirteen thousand slaves alone have passed the western terminous of this improvement. But excluding from our estimate of profits all these sources of revenue, excluding also every prospective addition to these resources which may be derived from the awakened energies of a people now slumbering over their invaluable interests; and confining our calculations to the tonnage known to exist, and now inviting this improvement, we shall see that on a capital of $2,000,000, adopting the calculations of Col. Crozet, the return would almost exceed credibility. Suppose the 150,000 tons actually seeking its destination, to travel on an average only through half the extent of our contemplated road, and suppose the average on freights, exports and imports to be reduced to four cents per ton per mile, the aggregate amount of the tonnage on the road would yield a revenue of six hundred thousand dollars annually.

Without pretending to accuracy in all our estimates and calculations, although they seem to us based on undeniable facts, and on the public reports of accredited public agents, we may safely assume that no error can place the revenue on this investment below twenty-five per cent. It may be objected that we have not taken into consideration the cost of the necessary engines, superintendence and repairs. To meet this objection, we suggest that the conveyance of passengers and the transportation of the mails must amply cover, if not largely exceed all such incidental expenses. But should our expectations from these sources prove fallacious, can a doubt be entertained that the transportation of the minerals above referred to which as certainly as the work shall have been constructed must, in large quantities, be transported on this route, will more than compensate for any deficiency in the other resources of the improvement.

In presenting these details we have endeavored to exhibit a simple and condensed view of the commercial advantages of the contemplated work. We cannot, however, overlook the social and political benefits which it cannot fail to secure. Who can look upon our vast territory and observe the advancement of our people in those stupendous improvements, which, spurning the common limits of space, are throwing their chains over the extremes of our union? Who can behold the continuous links which are already connecting Boston with the Roanoke on the east, and which promise to bring Mobile and New Orleans in close approximation with the southwestern valley, that does not feel the necessity of completing the intermediate link? In peace how largely must it contribute to the promotion of kind and social relations between the different portions of our territory? How rapidly will it diffuse among our people the blessings of knowledge and information? In war, should that evil unhappily come upon us, what invaluable facilities will it afford to every operation, whether designed for the annoyance of a common enemy or for the defence of our common country? In every view which we take of this work, its importance rises before us. As promoting commerce, agriculture and the arts, as strengthening and extending every tie of social life, as giving vigor to our arms, and stability to our institutions, we recommend this work to the warm support of our fellow citizens of Virginia and North Carolina.

GEO. TOWNES,
C. C. LEE,
N. M. TALIAFERRO,
E. W. S. CABELL.
BARTH W. EGAN.

From the New York Farmer.

RAVAGES OF AND REMEDY FOR THE NORTHERN WHEAT INSECT.

The grain fly, or insect, which, for a few years past, has been so destructive to wheat in many parts of the country, has this year extended his ravages, and excited, wherever he has made his appearance, very serious alarm. An eminent farmer in the State of New York wrote to me a year since, that he must give up the cultivation of wheat, as his crops were so much injured that he hardly obtained a return equal to the seed sown. I knew another instance in the same state, where, though the straw was large and the appearance promising, yet from thirty bushels sown not more than seven were obtained. I have known other cases in which the whole field has been mowed and sold for litter; and in a recent excursion up the valley of the Connecticut, I have heard complaints every where, and seen hundreds and hundreds of acres so destroyed that the grain they would yield would hardly pay for the reaping. Besides this, the same insect has destroyed many fields of rye in the same manner as the wheat, and had been found this year in the oats; the progress of the insect has been about forty miles a year; and a distinguished gentleman in Vermont, a practical and extensive farmer, remarked that he feared they would on this account be obliged to relinquish the cultivation of small grains.

The habits of the insect have not yet been accurately observed. I myself have not yet seen the fly, but have seen the worms in the kernel after the grain has been destroyed. He is represented as being a small reddish fly, which is seen hovering over the wheat fields in immense numbers, while just in flower, and has been observed to alight upon the kernel or bud, to ascend it, and then descending in the inner side, to deposite his egg between the stalk and the kernel. I purposely avoid the use of all scientific terms, wishing to be understood by common farmers. From this egg the worm is generated, which entirely consumes the grain while in the milk, leaving nothing but the husk, in which are found several small yellow worms, about an eighth of an inch in length. As the work of destruction is now completed, any farther observation of his habits are of no importance, unless we can some way reach so as to destroy the germ of the future insect. No preparation of the seed or ground, however, has as yet been found effectual to this end.

The continuance of the fly upon the grain is thought not to exceed three or four days, and they are, seen in greatest numbers just at night. Some farmers have found late sowing a partial security, as the season for the flies has passed away before the wheat was in condition for their attack. Spring wheat sown as late as the 20th and 28th of May has in a great measure escaped, while some sown as late as the 7th and 8th of June has been untouched, though in cases of such very late sowing, the farmer will be very fortunate if, in attempting to escape the fly, he does not get nipt by the frost.

I have now, however, the extraordinary happiness of announcing to the agricultural public, what there is reason to believe will prove an effectual, as it is a reasonable and feasible preventative. Should it prove effectual, the remedy will be worth millions and millions of dollars to the country. It was communicated to me on a late tour of agricultural inquiry and observation by Dr. Eliphalet Lyman, of Lancaster, N. H., an intelligent and practical farmer, whose crop of wheat usually averages from twenty-five to thirty bushels per acre. It consists in the application of fine slacked lime to the wheat just at the time of its heading out and flowering, at the rate of about a peck to the acre. It is sown broad-cast upon the wheat while the dew is on, and the field is rendered white with it. The best mode of applying it is with the hand, and for the person, who sows it, taking his proper breadth or cast, to walk backwards, so that he may not cover himself with the lime. It must be sown while the wheat is wet or the dew is on, and the philosophy of its application is very simple. The maggot of the fly is deposited between the grain and the stalk. It is, of course, an animal substance. The lime, or alkali, mixing with the dew, is carried down upon it, and neutralizes or destroys it. Dr. Lyman has now tried this preventative three successive years, and has invariably, as he assures me, saved his crops, while those of his neighbors have been destroyed.

I visited, at the same time, the field of a Mr. Bellows, in the same town, who had been advised by Dr. Lyman to make this application. The field consisted of several acres. He did it, and it has proved successful; and what is strongly confirmatory of the value of this remedy, is the fact that a field of rye belonging to Mr. Bellows, adjoining his wheat, and I think within the same enclosure, which was not limed, has been nearly destroyed by the fly.

These are certainly very important experiments, and I make no delay in presenting them to the public. Dr. Lyman has promised me a more particular account of the experiment and result, and likewise Mr. Bellows, which, as soon as received, I shall be happy to communicate. I have received an indirect and indefinite communication, that the same experiment has been successfully made in Gilmanton, N. H., but I have not yet been able to obtain either the name or the details.

HENRY COLMAN.

Meadowbanks, Sept. 15th, 1835.

AN EXPERIMENT OF EMANCIPATING NEGROES, UNDER VERY FAVORABLE CIRCUMSTANCES.

[The reader will observe that the following statement is not made by a slave holder, nor was it written or published in a slave holding state. The source from which it proceeds leaves no ground whatever for the suspicion that might otherwise exist, that the facts had been exaggerated by the prejudices or self interest of the holders of slaves. Such results as are here presented, of this experiment made in the free state of Ohio, have been also found in more than one instance in Virginia, when negroes were emancipated, and provided by their former owners with sufficient means for present subsistence, and future accumulation of property. We should be glad to be furnished by some of our Prince Edward subscribers, with a particular account of the descendants of the emancipated negroes in that county, which formerly belonged to Randolph's estate. That experiment has been in operation for some generations. The results, if correctly and minutely stated, would throw much light on this subject.]

From the Cincinnati Gazette.

Some forty miles from Cincinnati, to the east, are two settlements of free negroes—probably near a thousand, men, women, and children, of the true ebony color, with a very little mixture of the mahogany or lighter shades. The negroes own the lands occupied by them: but without the power to sell. Each family has a small farm. They are emancipated slaves, and these lands were purchased *expressly for them*, and parcelled out among them about fifteen years ago.

Their lands are not of the best quality of Ohio lands: but, by good management, could be made very good—they are particularly well adapted to grass, either meadow or pasture.

Having been formerly slaves, and compelled to work, one would suppose they ought to have *industrious* habits. They have had every inducement to industry and good conduct held out to them. The experiment was to test the merits of the negro race, under most favorable circumstances for success.

Has this experiment succeeded? *No, it has not.* In all Ohio, can any white settlement be found equally *wretched*—equally *unproductive*?

Farms given to them fifteen years ago, instead of being well improved, and timber preserved for farming, have been sadly managed—small, awkward clearings and those not in grass, but exhausted and worn out in corn crops—the timber greatly destroyed—wretched log houses, with mud floors, with chimnies of mud and wood—with little timber for further farming.

They are so excessively lazy and stupid, that the people of Georgetown (near by their 'camps') and the neighboring farmers will not employ them as work hands to any extent. They do not raise produce enough on their lands to feed their families, much less do they have a surplus for sale abroad. They pass most of the time in their little smoky cabins, too listless even to fiddle and dance. One may ride through the 'negro camps,' as they are called, passing a dozen straggling cabins with smoke issuing out of the ends, in the middle of little clearings, without seeing a soul, either at work or at play. The fear of starvation makes them work the least possible quantity, while they are much too lazy to play.

Why do not the zealous abolitionists go there and see the experiment in all its beauty? The slave changed into a free, but wretched savage! Why not make something of these thousand negroes? There are not more than two or three families out of the whole who are improved by the change from slavery to freedom.

The two negro settlements are a dead weight upon Brown County, as to any productive benefit from the negro lands, or from negro labor, and that space of country might as well, to this day, have remained in possession of the Indians.

If southern wealth can be applied to buy and colonize among us such worthless population, what farmer in Ohio is safe? Has he any guarantee that a black colony will not be established in his neighborhood?

Let any one who wishes to learn the operations of emancipated negroes, visit the Brown County *camps*. As they sink in laziness, poverty, and filth, they increase in numbers—their only produce is children. They want nothing but *cowries* to make them equal to the negroes of the Niger.

Extract from Wood's Notes on Geology.

STRUCTURES OF CALCAREOUS ROCK BY INSECTS.

From all the testimony we have been able to collect on the subject, it appears that the great southern basin is not so deep as the western.

This would seem the more probable from the fact, that the coral rocks and reefs are more abundant in the Pacific than in the Atlantic ocean. It is known that the animals which form these structures are scarcely ever found at greater depths than 25 or 30 feet beneath the surface, and yet many of the islands and shoals in the former, are entirely constructed by the labors of these parasites. In tropical climates they encircle entire islands by walls and reefs of their own construction and thus daily contribute to the enlargement of the coasts. A single coral reef, in the vicinity of the Australasian islands, is even seven hundred miles in length.

The quantity of carbonate of lime, furnished by madrepores and other polypous animals, together with the testacea, almost challenges credibility. Many have been at a loss to understand from whence they derive the materials necessary for the construction of such immense masses of calcareous matter. As sea-water contains but a trace of lime, it is thought they cannot separate it from this fluid, and as they are fixed to the spot which gave them birth, it is impossible for them to bring it from a distance. Lime is known to be an alkaline metal *(calcium)* in union with oxygen; and hence it is allied in structure, to potash, soda, and according to Sir H. Davy, ammonia. The chemist just named, *thought* he discovered a metallic property in some of the salts of the latter article; and hence he infers, that the others may be compounds of hydrogen and azote, combined in different proportions, which we, in the present state of chemistry, are unable to analyze. If this were all true, the formation of lime by animal secretion, admits of an easy explanation. Upon this principle a world might, in time, be formed by these minute *workies* out of air and water! By whatever process the lime is furnished; it is evident that these industrious parasites are rapidly elevating the bottom of the Southern Ocean. The work is going on there both rapidly and extensively; and millions of minute and immovable beings, are preparing a habitation for animals of a higher grade and different construction.

CONVERTIBILITY OF WHEAT INTO CHEAT, OR CHESS.

To the Editor of the Farmers' Register.

Madison County, Sept. 18th, 1835.

Seeing Mr. Carter's communication in the last No. of the Farmers' Register, stating that his manager had found a bunch of wheat and cheat growing from the same root, and seeing from your remarks, that you are an advocate of the immutability of wheat, and differing from you in this respect, I have been induced to send you the following facts (copied below from the American Journal of Geology, &c.,) stated by G. W. Featherstonhaugh, Esq., a gentleman who stands unrivalled in a knowledge of Natural Science, and together with the opinion of our venerable Madison, ought certainly, Mr. Editor, to be a preponderating weight in the scale of the mutability of wheat. Whilst this question has been so long discussed, I have seen nothing said respecting cheat in flax. I have, Mr. Editor, been in the practice of raising flax for 20 years, and have taken pains to get my seed clear of the cheat seed, (which differs as much from the cheat in wheat, as wheat does from flax,) notwithstanding I have been frequently disappointed in my crop of flax, owing to the quantity of cheat. Why is it that this cheat is found no where but with flax? I do not recollect of having seen a single stalk on my farm away from my flax ground. If flax is seeded too early in the spring, or the flax should receive a check after coming up, there will be a quantity of cheat. I can account for it, Mr. Editor, but in one way—and that is, that the flax degenerates to cheat.

C.

"The opinion continues to be very much encouraged amongst agriculturists, that the heads of cheat or chess, which are often found in wheat fields, take their origin from seeds like those which they bear, and not from the seeds of wheat, which many insist are immutable and undegenerate in their nature. This opinion is a very natural, and perhaps, a very useful one to entertain, as it induces great vigilance on the part of the farmer in the selection of his seed wheat. Having practised farming upon a tolerable extensive scale during the most active part of my life, my opinions as to the immutability of wheat, were long ago shaken. After attending to the selection of seed with the most scrupulous care, and with experimental views, I was too often disappointed when I had the greatest reason to entertain sanguine expectations in favor of the immutability system. Upon more than one occasion too, when I had every possible persuasion, and had seen the spring open upon a fine field, as I thought, of wheat in the grass, I had the mortification to find it shoot up *almost entirely* into chess. The friends of immutability told me that the chess had eaten the wheat out, but they never told me how the chess got into the field, or why the wheat had not eaten it out, which I should much have preferred. However, I sometimes had a great crop of wheat, and perhaps the chess was eaten out upon these occasions.

"Having had a liberal share of agricultural controversy, I am content to let others enjoy their opinions, however distant they may be from my own on such subjects, and do not wish to be thought desirous of encroaching upon a province, which now engages the attention of many able agricultural editors.

"I have a fact, however, to communicate to my botanical and agricultural readers, which ought to have weight in a controverted matter of very great interest.

"Whilst on a geological excursion this summer, in Virginia, at the close of the wheat harvest, Mr. Conway, of Rapid Ann, Madison county, presented me with a plant of cheat or chess, which he had plucked up by the roots from one of his wheat fields. Mr. Conway's attention having been long drawn to the appearance of cheat in his wheat fields, was in the habit of examining plants of this kind from time to time. The plant he exhibited, and which was but recently taken from the field, consisted of four stalks, not in the least broken, and as perfect as when they were growing in the fields. Each of these stalks bore a profusion of the heads of cheat, and nothing whatever that approached, in the least, to an ear of wheat. As far as the heads went it was a perfect specimen of cheat or chess. The plant having been carefully drawn from the field had all its roots attached to it, without any visible fracture, and in the most natural manner. Mr. Conway, however, drew my attention to the skin of the kernel of the seed from which this plant had proceeded, and which was attached to the radicle in a situation quite distinct from the lateral roots. The skin was that of a kernel of wheat, and upon applying a microscope to it, I found that it had been a kernel of wheat, and nothing else; not differing in the least from the skins of wheat seed as they are often found adhering to the radicles of wheat plants, bearing regular ears of wheat when the heads are well formed. This was the opinion of Mr. Conway, who declared himself satisfied from the inspection of this plant, that, in this particular instance at least, *a kernel of wheat had produced a plant, bearing four stalks with ears of cheat or chess.* Mr. Conway informed me, that one or two of his neighbors had found similar plants this summer, and come to the same conclusion, that cheat could be produced from wheat seeds.

"The evening before my interview with Mr. Conway, the apparent convertibility of wheat into cheat was the subject of a long conversation between Mr. Madison (under whose hospitable roof I found most welcome head-quarters during my tour in Virginia,) and myself. We had been old correspondents on agricultural subjects, and we entered into it *con amore.* That venerable man, who at the age of eighty-two, preserves all the vigor of a highly polished and unrivalled mind, related to me the many experiments he had personally conducted in his garden at Montpelier, by sowing cheat to produce wheat, but all in vain, he had never succeeded in prevailing upon it to retract its perverse deviation from its type; and Mr. Madison had paid too much attention to the production of cheat in wheat fields, not to be impressed with the many strong reasons there were to suppose that wheat, which belongs to the Gramineæ, could degenerate into a plant which approaches the grasses. He examined, on my return to his house, the plant which I brought from Mr. Conway's, and expressed himself satisfied that, in this particular instance a kernel of wheat had produced a plant bearing heads of cheat. I still possess this curious plant, and it will give me great pleasure to show it to any agricultural or botanical gentleman who desire to be convinced that I have related the state of this plant faithfully. It appears to me, however, that if farmers would carefully remove plants of cheat at the proper season, after the heads are out, but whilst the stalks are yet green, that the controversy on this subject would soon cease. The single fact I have brought forward, ought to have great weight, and I have no doubt, that another season will give it all the support it may now appear to want.

"I shall rely upon this fact at present: I shall not attempt to support it by any arguments drawn from the philosophy of plants, or theories of vegetation. There are, however, some very important views which bear upon the economy of agriculture, and are within the scope of this work, which will probably be brought forward in the second volume of this journal.

G. W. FEATHERSTONHAUGH."

For the Farmers' Register.

FOLLOW NATURE.

Wardsfork, (Charlotte,) Aug. 27th, 1835.

In all our attempts at agricultural improvement, (to succeed) we must follow the indications of nature. Whenever we are in doubt of the way, we should not be misled by every *ignis fatuus* of speculation—but eye attentively the finger of direction on the way-side—for nature has fixed a signpost at every fork, so that the wayfaring man may not err. Man in his inquiries after truth, is prone too much to listen to the suggestion of a theorising fancy—and when the mind becomes vain of its own ingenuity, and amazed with its own reveries, it turns with disgust from the more laborious but more certain pursuit of truth, in the way of observation and experiment. The wise physician, in order to find out the best indications of cure, applies his finger attentively to the pulse, and looks steadily on the countenance of his patient. So should the agriculturist, who has to restore to health a diseased and exhausted soil, apply his nicest touch and scrutinizing look, to the indications of the *vis medicatrix naturæ* of agriculture.

Amid the now noisy clash of discussion, and the conflicting jar of registered essays, the still small voice of practical truth is not sufficiently regarded. Let us lay aside much of speculation and noisy talking, and elaborate writing, and go forth into our fields, with the eye and touch of observation, under the light of nature, and find out, each for himself, where lies the truth. I would not be understood as objecting to discussion, conversation, or written essays on agricultural subjects, where they are not substituted for practice and experiment, and directed too much by a theorising spirit. When properly conducted, they become the reservoirs of tried truth, and the channels for circulating the refreshing and fertilizing water of knowledge through all the desolate and thirsty places of our country.

But to return. If we would catch the true spirit of improvement, we must bow at nature's shrine, and consult her oracles. If we would move onward to perfection in agricultural science, we must invoke her aid. Do you wish to reclaim land subject to injury from water?—notice the natural direction which the water is disposed to take, trace out that course with your spade, and by this simple and sure method you redeem the lost soil, and render it safe and productive. But on the other hand, if you run an awkward ditch without any regard to the direction of the stream, you incur all the expense and trouble, without any sort of advantage. The simpleton who obstinately slights the indications of nature, will always reap trouble and expense only, for his pains. Do you wish to rear a valuable fruit tree? plant it where nature has said it should grow; and when you come to look for fruit, you shall find it. But if you tear the scion from its proper home with a rash and heedless hand, and force it into a soil and situation uncongenial to its nature, it will not flourish, but die, and its withering branches shall upbraid him with folly who planted it.

When you undertake to turn nature out of her course in any department of her operations, there is a reaction immediately produced—the protecting principle is aroused into action to counteract the effects of this encroachment on her laws. For example: if you throw an obstruction across a stream, the water gathers above, accumulates force, and endeavors to remove the barrier. The weight of the water above, and the fall of the water below, (undermining) both contributing to bring things to their natural state.

Again: you see the same thing exemplified in diking. If too great encroachment is made on the natural boundaries of the stream, by an injudicious embankment, you will be chastised for this violation of nature's laws, by the loss of your dike. Many of the dikes that have been raised of late, have been so injudiciously contrived, that their broken backs and excavated sides will tell to future times the folly of their builders. Where they are constructed with due regard to the natural privileges of the water, they are useful, [but not] where the stream cannot be straightened all the way, or where there is not sufficient fall (when straightened,) to keep the low lands out of the reach of freshets.

Let us observe the indications of nature with regard to the application of manures. Her object seems to be two-fold—to cover soil from extreme heat and cold, and to invigorate the productive principle. The matter used are leaves, weeds, grasses, sediment, &c. The time of applying is the fall. The part to which she applies, is the surface. It is a little curious how she manages this business, about the time she brings her materials to the greatest perfection. She employs the hand of frost to prepare, and the wings of the wind to scatter broad cast. In the fall, and while the matter rots, the rich juices are trickling into the soil, while the woody parts remain on the surface as a cover to protect against winter cold. I could enumerate many other examples, to show that to succeed in agricultural improvement, we must follow the *indications of nature*—but let these, for the present, suffice.

J. R.

From the Philadelphia Commercial Herald.

SILK.

In every part of our country, attention is wakened to this important and profitable branch of manufacture. New England, however, having taken the lead, seems likely to enjoy for the present nearly a monopoly of the production. A company, with a capital of $200,000 has been formed at Boston, called the Massachusetts Silk Company, which has for its object the culture and manufacture of this article. This company has purchased several tracts of land at Northampton, on which are one or more water privileges, and their factory will probably be erected in that town.

Northamption also contains a silk cocoonery, lately the property of Mr. Samuel Whitmarsh, capable of feeding four or five millions of worms, though the number at present does not exceed 800,000. The building is two hundred feet long and two stories in height. It is filled with ranges of sliding drawers of twine lattice work, on which the worms feed, and these are intersected by alleys, so that there is abundance of both air and light.

The New England Silk Company has likewise been formed at Boston with a capital of $100,000. Their manufactory is under the superintendence of Mr. Cobb of Dedham, whose works the company have purchased. It is wholly dependent at present on foreign culture for its supply of material, and is compelled to resort to the manufacture of articles in which silk is only a component part.

The Connecticut Silk Factory at Hartford, has a capital of $100,000. Their building is furnished with 100 looms, and preparatory machinery to be moved by a steam engine of eight or ten horse power. The want of stock compels this factory also to the production of articles in which the proportion of silk to the other materials is small. There is also a factory in progress at Poughkeepsie, N. Y. At Concord, N. H. a farm has been purchased for the cultivation of the mulberry.

The establishment of the Valentine Company at Providence, R. I. now sold to a company from New York and Boston, includes a plantation, containing 30,000 trees, from four to five years old, and from six to eight feet in height. It is supposed, that for the next five years this plantation will yield an average product of half a pound of silk to a tree. This company has also manufactured a considerable quantity of silk goods, and fitted up a building 30 feet by 90, three stories high, to be exclusively devoted to this branch of manufacture. The machinery is carried by steam. A trial of the power loom in this factory has proved that it will answer as well for silk as for cotton, and that, with experience in its management, it will probably turn out as many yards of the former as of the latter. A silk society has been formed at New Haven.

To encourage the production of this article a bounty has been offered by the state of Massachusetts on reeled silk, and by Connecticut both on this and on the trees themselves. The natural advantages, however, for the production, must of necessity, be greater in the middle and southern states.

The wild mulberry exists in abundance in Virginia and Mississippi, and in the forests of the latter state, silkworms are found growing spontaneously. The native tree, however, is not found to produce silk of merchantable quality. It is thought that by engrafting scions of the white or Italian mulberry into these wild stocks, a tree will be produced of hardier growth, and less liable to injury from atmospheric changes.

We are indebted for the above information to the Silk Culturist, a monthly publication, commenced in Hartfold in April last, the pages of which are principally devoted to this interesting topic. To those engaged in the cultivation of the mulberry, the instructions contained in this periodical must be highly valuable. From the novelty of this branch of agriculture among us, information in regard to its details is peculiarly needed. The journal is published by an association called the Hartford County Silk Society, and furnished to subscribers at 50 cents per annum.

THE NATIVE MULBERRY FOR SILK WORMS.

The foregoing article shows at a glance that the people of New England are about to make silk culture a large and important branch of their rural economy. It is there no new and untried speculation. The business has long been pursued in Connecticut, and with results so satisfactory as to induce these recent and far more expensive investments for the same object. If good profits can be there made, in the cold and unfriendly climate of New England, (where it is yet a problem to be solved whether the best species of mulberry can stand the winter's cold,) how much more profitable would the business be in Virginia and the more southern states? Our *cheaper* slave labor would also afford advantages, and many aged or infirm hands could be profitably employed in this business, who are now a useless expense to their owners. Much land that yields no net profit under usual crops, would serve well for mulberry trees.

The opinion expressed above of the worthlessness of the native (black or red) mulberry tree, for yielding silk, is as general as it is erroneous—and the error (though of use to nursery-men,) is very injurious to the community, in causing all efforts in silk making to be postponed until mulberry trees can be reared. Now, though professing to know very little of silk culture, we will venture to assert that those who can *succeed well* by using leaves of the white mulberry, will not *fail*, nor do a much worse business, with the black. The black is doubtless somewhat inferior to the white mulberry, as this is to the Chinese: but the difference of products from either two, would not be so great as would be made by the difference of care and management of almost any two new silk growers.

Dr. Wm. I. Cocke of Sussex, Va. some years ago fed some silkworms on the leaves of the common mulberry, and others on those of the white, and prepared sewing silk from each kind. It was either his first or second year's trial of the culture, and on a small scale, and of course attended with all the disadvantages of a new beginning, independent of any inferiority of the kind of food used. He sent specimens of the silk from the common black mulberry to Mr. Du Ponceau of Philadelphia, who, in conjunction with Mr. D'Homergue, was then writing to urge the undertaking of this business. The specimen was considered by the latter as so excellent, that he at once pronounced, in the presence of the gentleman who carried it, that it could not have been the product of the native mulberry. The bearer of the specimens, however, was enabled to declare the contrary, he having been during the time, a member of Dr. Cocke's family, and acquainted with all the circumstances of the experiment. Still no subsequent allusion was made to this circumstance, though it was so well calculated to encourage early and general efforts—and probably, because of some lingering remains of doubt of the correctness of the experiment, or the statement, the results being so different from received opinions.

But while we advise those who wish to rear silk-worms to use the native mulberry trees, if they are ready and convenient, we also recommend to them the immediate planting of a better kind, and especially of the new Chinese, (or Morus Multicaulis,) for future use. If there is doubt whether this valuable tree will thrive farther north, there can be none here—and as it furnishes undoubtedly the most abundant and nutritious food, and as the silk business *must* extend rapidly, every acre of land now, or soon, planted with cuttings of this tree, will be almost sure to yield a highly profitable crop, either for sale or for use.

From the Baltimore American.

MACHINE FOR FELLING TREES.

A most valuable invention has lately been made by Mr. James Hamilton of New York, which will be the means of saving an immensity of labor in this country. It is a machine for *felling trees*. The New York American gives, from the New York Mechanic's Magazine, a description of it, accompanied by a drawing. This machine requires very little more space for use than is required for the swing of an axe, and may be used in almost any situation in which a man can use an axe. It may be moved from tree to tree by one man, who can with it cut through a stem of two feet diameter in five minutes: two men will, however, work it to more advantage. It is so constructed as to admit of saws of different lengths according to the size of the tree. A committee of the American Institute at New York commend it in strong terms. It cuts the stumps uniformly of an equal height, and at least a foot nearer the ground than is usual, whereby the most valuable part of the timber is saved, besides all the after labor of squaring the end. The cost of the machine is about $50, and it is believed that with it two men can fell as much timber in a given time as twenty can with the axe.

INQUIRY ON SWAMP MUD. TWIN CORN.

To the Editor of the Farmers' Register.

Cypress Spring, Essex County, Sept. 21st, 1835.

I am now about commencing an experiment with swamp mud as a manure, and should be glad to get information upon the subject from some one of your correspondents, as to its effects, and the best mode of applying it.

I was induced from reading the address of James M. Garnett, Esq. to the Agricultural Society of Fredericksburg, recorded in your paper, (No. 8, Vol. II.) as well as from his personal recommendation, to make trial of the twin (or as he calls it extra-prolific) corn, and obtained from Maryland a barrel, about two bushels of which I planted, some on inferior high land, and some in low ground. It has succeeded beyond my expectation; every stalk has two, three, and frequently four and five ears, not large, but I think two are more than equal to one ear of the corn commonly planted with us.

PETER J. DERIEUX.

IRISH POTATOES—MANGEL WURTZEL, &c.

To the Editor of the Farmers' Register.

Accompanying this communication you will probably receive a few Irish potatoes, and a part of a mangel wurtzel beet, indicative of its size, which I transmit you as a prelude to my method of cultivation, &c. Although there is nothing in it variant from that pursued by many, (except perhaps its imperfections resulting from a want of skill,) I have thought its publication might be profitable to some, while it certainly cannot be injurious to any. There is scarcely any culinary vegetable which exceeds in value the Irish potato, on account both of the quantity of product, as well as the duration and easy preservation of which it is susceptible. The whole *modus operandi* in managing the early crop, is I presume, well understood. It is the late or second crop, to which I wish to call your attention, as both combined, furnish a supply of this delightful vegetable throughout the year. The plan which I have adopted (in imitation of others,) is simply about the middle of June to hill up my tobacco patches, after the plants are drawn, and to deposite a whole potato in each hill: one weeding, and two hillings, usually complete the whole process of cultivation. A statement of the quantity which may be thus produced on suitable land, would almost "invite incredulity" unnecessarily, as it is my only object to induce experiment. We know that Ireland is most celebrated for the quantity and quality of its potatoes—and as soil and climate are amongst the chief agents of vegetation, its success may be fairly attributable to a peculiarly suitable combination of each. The system under discussion, secures its low moist soil, and cool autumnal climate in which to ripen. Then with the assistance of both the principal agents, why cannot we be equally successful? The last season was rather wet for them—though from the size of those I send you, (from 12 to 14 inches in circumference,) you would probably not consider it desirable for them to be larger. It is not the size however, so much as the double crop, and consequent supply through the whole year, which recommends this method of cultivation. Their preservation through the winter is a source of no difficulty whatever. The day on which they are dug (as early as convenient after the first killing frost,) they may be transferred to an elevated spot in the garden, and deposited in a hole two feet deep, and as wide as desirable. Over them a mound of earth should be raised in a pyramidal form, so as to prevent the penetration of moisture. In this way they may be kept perfectly sound and fresh through the winter. On the approach of warm weather, in March, they should be removed to a drier and more elevated place, to arrest vegetation. Those intended for seed should be spread, as the fermentation incident to a close heap, might destroy their vegetative property. It is not by any means essential that they be confined to plant-patches. I only use them because they are fit for little else the first year. Some of the largest I made this year grew on land which had been repeatedly tended in corn—but similar in other respects.

The mangel wurtzel (which measured 23 inches in circumference when growing,) was planted about the first of April, in land which had been ploughed deep and coultered—laid off in trenches two feet apart—and the coulter run twice in the bottom of them. Manure was then thinly spread in the trenches, and mixed with the dirt, over which the seed were drilled quite thick, and afterwards thinned to about eight inches. The subsequent cultivation was performed with the coulter and hoe. Mr. John Hare Powell published a statement (vouched by a number of certificates,) that he had produced (according to my present recollection,) at the rate of sixteen hundred bushels to the acre. It is eaten voraciously by hogs when thrown immediately from the patch—though its nutritive qualities would no doubt be greatly enhanced by boiling. It affords a very convenient and profitable substitute for corn, when the resources of the harvest field begin to fail—and is easily preserved through the winter. I have not sent you the above mentioned specimens by way of boasting of their superior size, nor of any skill or originality in their cultivation, but merely to show you the results that may be easily attained without either.

E. G. BOOTH.

Shenstone, Oct. 16, 1835.

For the Farmers' Register.

OBSERVATIONS ON THE LOW WAGES OF FEMALE LABORERS.—No. 3.

[Concluded from page 381.]

In the two preceding Nos. I have stated at some length, the grievances of laboring females, and traced the effects from causes that lie in the institutions, habits, and prejudices of society. It is now my purpose to treat of remedies for these enormous evils—and for this, I feel, and readily admit, the inadequacy of my powers of devising the best plans, or for persuading others to act on my suggestions. Would that I could awaken the zeal, and engage the influence for this great and benevolent undertaking, of some of those who are able to imitate the examples of a Howard, a Wilberforce, or of the far more admirable Oberlin! And how much does this work surpass in value and importance, the objects of either of these illustrious philanthropists! It is not so partial a good as merely to alleviate the sufferings of the suspected or convicted felons which filled the prisons of Europe—or of the savage inhabitants of Africa, whose condition at home was often as deplorable as the horrors of the middle passage, and of West Indian slavery—nor even as grew from the enlightened and noble works of the heavenly minded Oberlin, which were limited by his position to a narrow compass, and which were doomed to end almost as soon as his own life and labors. Far above all these would be the benefit of properly employing and fairly compensating female labor. It would be rendering justice, (which has so long been withheld,) to all the poor of the purer and better half of the civilized human race—and these are not strangers, and separate from ourselves in interest: the class of sufferers includes our countrywomen, friends and valued associates—it *may*, and very probably *will* hereafter include some of the near and most beloved relatives or connexions of all who may read these remarks. What benevolent object then, is more worthy of the aid, and of the zealous efforts of the philanthropist, the patriot, and the christian?

Females are naturally as well suited as males to perform at least half the mechanical labors which are now principally or entirely executed by the latter. For very delicate operations (as, for example, parts of the business of engravers, watchmakers, and printers,) they are even better fitted. For some other situations in which some mental power and education are required, as well as mechanical skill, women are at least as well qualified. It is not necessary to particularize these employments to show that there are plenty to engage all the labor of females who would need to resort to them. There are even employments for women which might well engage the rich, the educated and the refined—and in some other countries such women are so occupied. In France, not only the retail shopkeeping is generally in the hands of women, but the wife of a merchant of the most extensive business is often his best assistant, and efficient and enlightened partner in trade.

The first remedial measure for the existing artificial and unhappy position of women, which especially prevails in this country, is, that every individual, of either sex, who is sensible of the evil, should lend his individual countenance and support to the proper employment and fair compensation of female labor, and to the shaking off the existing prejudices which oppose so many obstructions to its exercise. A very partial exertion of this moral force, would render much service. But the evil is too old, too deeply rooted, and widely extended, to be removed by individual efforts alone. Society has raised the barriers—and society, or the organized and continued action of many individuals, only can level them. With these views, I will propose the outlines of a plan for combined action, which, however partial in effect, may serve to commence this good work—and may suggest to others better means for attaining the great object in view.

Besides the exercise of individual influence and effort for the same end, it is proposed that there should be formed in each, or any one town, or community, an *Association for encouraging the employment, and increasing the remuneration of female labor*—to be composed of all persons of both sexes who concur in approving the scheme. It should not be attempted to increase (by direct means) the compensation for existing employments, however small it now may be—(the objections to which attempt have been stated in No. I.—) but to create and increase new employments, which, if effected, would ultimately, and by proper means, serve to increase the compensation for the old, as well as the new. By discussion and by publications much might be done to awaken numerous other individuals to the importance of the design, and to engage their co-operation. The association could effect much by the promise of the preference of its members in dealing with those tradesmen who employed female apprentices or laborers, (upon proper and fixed stipulated terms,) and especially in cases where some of these apprentices were the daughters or other near relations of the mechanics or merchants who employed them. The latter circumstance would have two very important effects in the commencement of so novel a state of things—1st, to ensure the most perfect state of propriety of manners and moral *habits* in the several private establishments where female apprentices were admitted—and 2ndly, to engage the strong influence of parental feeling in sustaining the respectability and good reputation of these establishments.

But though such measures, judiciously executed, would engage in this good work many tradesmen by the strong tie of self-interest, and the prospects of pecuniary gain, still there might be others who would oppose and obstruct the reformation—either from short-sighted and mistaken views of their own future profits—or because (as in the case of the tailors,) they would be deprived of the unrighteous harvest which they now derive from the degraded and wretched state of female laborers. To guard against either or both these causes of opposition, and possible failure, the association might use another and still more efficient means. This would consist in establishing (in conjunction with individual undertakers, or otherwise,) workshops to carry on the whole business of any particular branches of trade, that might be considered the most suitable for female labor, or which embraced the smallest portions for which male labor was indispensable. These more public establishments should be, of course, under the general direction and control of the association, and so organized that every proper care could be taken to maintain the purity and correct conduct of the inmates—and that a portion of the time of the apprentices should be given to mental and moral instruction, and to the performance of those household duties which all women should be acquainted with.

The most suitable business first to be undertaken in such an establishment, of course would be that of the tailors—who may be considered as the natural enemies and oppressors of laboring females. Even now, women actually perform a large part of the work for which tailors are employed and paid—and for a mere pittance of the price obtained by their employers—and women are now well prepared, and sufficiently skilled, to execute the whole of this work, with no other loss to the community than that our coats would not at first fit so well as to satisfy the practised eye and exquisite taste of a dandy. But even this trivial objection could be easily removed. One male measurer and cutter of men's clothes would be sufficient for an establishment of more than twenty female tailors—and there is no reason why such an assistant might not be employed by the female head of the shop. Even if this one branch of the business should necessarily remain in male hands, it would compel nine-tenths of all the future race of male tailors to seek more manly employments—and would double the present small demand for, and miserable compensation of women. If this change bore hard on the present race of the knights of the thimble, it would be the only case—and there is no class, the members of which would so well deserve to bear some of the privations which they have so long inflicted on others. It would be well if public opinion could entirely root out this business, so unworthy of *men*—and as exercised by men, so injurious to women.

Another mechanical employment which seems well suited to females, is printing. Women could make more skillful compositors than men, and would be able to do more of that kind of work in the same time. This principal part of the labor requires not strength—but quickness of movement and delicacy of touch. This part of the business too might be conducted in an apartment quite separated from the other parts of a printing establishment, and therefore there would be no need of bringing together different sexes, or different classes. But even this seclusion would be unnecessary—as one master printer, as head of the establishment, and one pressman, would be as many males as would be needed in an office in which eight or ten hands might be employed. Greater or less facilities for employing females in a manner altogether unobjectionable, may be found in various other kinds of business: but these examples will be enough to mention here.

Of course many male laborers and mechanics (in the spirit of "trades' unions" and of "strikes,") would cry out against every effort of this kind, as calculated to deprive them of employment. But this clamor would be groundless. Except in the tailors' trade—to which many women have already served a long and laborious apprenticeship, and are fully competent to earn journeymen's wages, without having yet been permitted to do so—there would be no immediate loss of employment to any males—nor any future loss, unless it was their own fault. In most or all other pursuits than that of using the needle, females could only be received as *apprentices*, and of course no more girls would be taken, than would be required by the demands of trade, and whose places would (without this scheme) have been filled by just so many boys. The difference of sex in apprentices hereafter to be received, could in no way affect the demand for, and employment of the present race of journeymen mechanics, even if they continued as journeymen, and unmarried. But every sober, industrious and capable journeyman, in 7 or 8 years will probably be either a master workman, or a married man, or both—and in either condition, he will be benefited by the success of the scheme of employing women. As a hirer of their labor, he would be better and more cheaply served—and he would have a sure resource to save his young daughters from the danger of future want and misery. Girls would generally be more valuable as apprentices than boys, because the latter are more likely to be disobedient, vicious, and unprofitable laborers. As independent laborers, after serving through their apprenticeship, females still (at least for years to come,) would be hired at less wages than males—and the difference would be a great profit to their employers and to the public, while even at that reduced rate, they would earn four-fold what is now obtained by them, in their only employment of sewing.

It may be said that if so much advantage and profit are promised by employing female apprentices, why may not the plan be safely left to individuals to adopt and execute? It is because no one individual could give sufficient assurance of the stability of his purpose, and permanency of his plans, to induce parents to confide their daughters to his charge, and to risk the prosperity of their lives on the issue of an untried, and therefore extremely doubtful experiment. Hence the necessity of the support and guaranty of an association of many individuals. It would not be their money that would be wanted—or at least but little, and that only in the commencement—but the support and strength furnished by their favor, and their influence with the public. A master printer and publisher, for example, who would take a dozen female apprentices, could not fail to make sufficient profit, provided he was merely assured of having enough work furnished to him, at fair prices, or of sufficient demand for his publications. But without an assurance of full employment, he could not justifiably, assume such duties, and such heavy responsibility, nor would he be trusted by others with so delicate and important a charge. Give such individuals however, the backing of a permanent association, and these difficulties would be removed—not speedily perhaps, but surely, and effectually.

We are a people slow to abandon old usages, and it is to be feared that it would be long before any considerable change in labor could be produced even by zealous and well directed efforts for the purpose. More especially would it be difficult to induce the parents and friends of young girls to adopt for them such novel measures, even though heartily approved by them in theory, lest there should be a failure in the attempt, or some loss of *caste*, and even of character be sustained, from improper company, or from unfounded popular prejudice. These objections, these fears, would proceed from feelings that deserve all respect and indulgence—they would be excited by the general purity of our female population, and by the keen sensitiveness as to the most distant approach to any thing like a stain on female character. Long may these feelings exist! It would be the care of the members of the association to cherish them—and to take every care to treat with attention and respect the young females who may be trusted to their guardianship. This could be easily and completely effected. The working establishments under their patronage, might be as well organized to secure purity of morals, and propriety of manners, as the best boarding schools—and every apprentice might be made sensible, by the kind notice of the ladies who were members, that their labors were as honorable, as idleness and dependence would be likely to lead to want, and degradation.

It may be objected to this scheme, that as soon as a female apprentice had served her time, and was capable of earning good wages, that she would often become a wife and a mother, and then be compelled to renounce her acquired trade. Even were this to be the case, there would be no loss sustained greater than is now general. The female would have been at least well employed, for the interest of others, for some previous years, and would probably have acquired habits of industry and economy, which would be valuable in any condition of life. But this worst case would not be so frequent as others of very different character. Young and poor females often marry on the first tolerable opportunity, and most imprudently, not so much from inclination, as to gain a home and asylum from dependence and threatening want—and without considering that the step is almost sure to bring greater future want and misery to themselves and their children. Now the acquiring of a good and gainful trade would make a girl at once independent—and would be doubly a safeguard against her marrying without proper motives, or very hastily and imprudently. At any rate, it would be a strong inducement to postpone marriage until the wages of a few years had been accumulated—and thus the evils of imprudent marriages would be greatly lessened, if not often avoided altogether.

If such measures as have been proposed, could be used, and had the effects anticipated, the results would not be more important to the interest and happiness of women, than to society at large. The many thousands of young girls who will otherwise grow up to live, like their predecessors, in dependence, and destitute of the common comforts and even of necessaries, would be made independent of the charity, or of the oppression of others, and would possess within themselves the sure means of earning a competent and respectable support. There would be removed the now existing powerful inducements, (amounting often to necessity,) for many a mercenary marriage—which, whether the object be a life of luxury and splendor, or merely to secure bread under the shelter of a hovel, is simply a species of legal prostitution. The laborious father who had necessarily lived "steeped in poverty," to support a large family of young children, in dying, would be relieved of the heart-rending conviction which must now exist, that his daughters would be destitute except from the charity of friends, or of strangers.

By the change of position contemplated, woman would rise in the scale of society, and in dignity of character, as much as in comfort and happiness. She would be a substantive being—no longer a mere adjective to and dependent on man, whether situated as his valued companion and sharer of his toils and pleasures, or the mere object of his sensuality—as the pensioner on his bounty, or the slave and victim of his selfish tyranny. Nor, by this change, would there be any loss in the value of woman, as the solace, and best of all the blessings of man: on the contrary, she would become so much the more prized, so much the more a dispenser of happiness as a companion and wife, in proportion to her advancement in useful pursuits, and to that increase of knowledge and enlargement of mind, which would necessarily follow such pursuits.

The men, who would otherwise have occupied the places which this scheme would give to females, would be engaged in other pursuits requiring the strength, (physical or mental,) the energy or the enterprise of the stronger sex. In our young country there can be no want of demand for services in all such pursuits; and of course no loss, private or public, by the change of occupations could be expected to occur.

To the commonwealth, to the public interests, the gain would consist in the change of many thousands of unproductive consumers, to productive and profitable laborers—the obtaining, in fact, the fruits of the advantageous employment of half our population, which now may be considered (as to the public interests) as a class of paupers—which take away much from the public wealth, and return no compensation, except as *breeders*, and reproducers of the class of male laborers, which existing institutions and prejudices have made the only productive class.

POLECON.

SCRAPS FROM OLD AUTHORS RESPECTING VIRGINIA.

To the Editor of the Farmers' Register.

I send you some notes on the natural history of Virginia—Indian words, &c., taken principally from the old histories of Smith, and Beverly, and Stith. Smith you know writes in the uncouth simplicity of a soldier; and Mr. Jefferson has said that Beverly is as much too concise and unsatisfactory, as Stith is prolix and dry.

Indian words.

Putchamins—Persimmons.

Pawcohiccora—Milk of walnuts.

The Indians beat hickory nuts or walnuts—mixed water—when it looked like milk—hence they called cows-milk, hickory.

Maracocks—A fruit like a lemon. This is the fruit of the passion flower.

Popanow—Winter.

Cohonk—Winter. Cohonk was the cry of wild geese, whence it was applied to winter.

Cattapeak—Spring.

Cohattayough—Summer.

Messinough—Earing of corn.

Taquitock—Fall of leaves.

Ponap—Meal dumplings.

An old writer says the *pone*, a favorite corn meal bread in Virginia, is not derived from the Latin *panis*, but from the Indian *oppone!*

Ustatahamen—Hominy. Lord Bacon calls this "cream of maize," and commends it as a most nutritious diet. The Indians also made bread of the sunflower seed.

Macocks and Cushaw—Names for the cymbling—called by the Indians of the north, squash—which is an *onomatapeia.*

Messamins—Muscadine grapes.

Checkinquamins—Chinquapins.

In the botanical department, Beverly had met with the following:

Three sorts of cherries.

Persimmons.

Three sorts of mulberries.

Two sorts of currants.

Three sorts of hurts or huckleberrys. It seems in his day they knew no such word as whortleberry, made since to puzzle the wits of school boys.

Cranberries—probably the same with Captain Smith's rawcomens.

Wild raspberries—probably blackberries, and the wild strawberry.

Nuts—chestnuts, chinquapins, hazel-nuts, hickories, walnuts.

Six species of the grape.

The honey tree—sugar tree—the maple. The Indians had made the maple sugar time out of mind.

Maycocks—maracocks—lupines.

Myrtle-wax—out of which were made candles without grease, never melting, and exhaling a fragrant incense.

Puccoon and musquaspen roots, with which the Indians painted themselves.

Sumach and sassafras.

Jamestown weed—"a great *cooler.*"

Flowers—The crown imperial—The scarlet cardinal flower—Magnolia glauca, and liriodendron tulipifera.

Of Indian corn, four sorts.

The tuckahoe—a tuberous root growing like the flag in marshes. There is a place of this name in New York, and a creek in Virginia, the people living east of which are termed Tuckahoes, as those on the west are styled Cohees.

The Indians had no salt but what they found in ashes. They were exceeding fond of roasting-ears. They had dried peaches.

Perhaps our Virginians are not aware that their ancestors amused themselves catching wild horses. They hunted them in the uplands. But it was unprofitable sport—more tame horses killed, than caught of the wild.

1699. Eight hundred Huguenots settled in Monocan town, south side of James River, 20 miles above Richmond. They attempted to tame buffaloes, by catching them young. They also made a strong-bodied claret wine of wild grapes.

Prices current in Virginia in 1703.

Beef and pork, from	1*d* to 2*d*.
Poulets,	6
Capons,	8 to 9
Chickens,	3 shillings a doz
Ducks,	9 a piece.
Geese,	1 shilling.
Turkey hens,	18
Turkey cocks,	20
Deer,	10 shill. a head.

In the time of Beverly, oysters and wild fowl were the cheapest food going—ducks so plenty, that the historian, though a poor shot, killed twenty at a bang.

For sauces they used red buds and sassafras.

But withal they were so lazy and good-for-nothing a pack as to send home to England for cabinets, chairs, tables, stools, chests, boxes, cart-wheels, bowls, and birchen brooms. Just so their lazy and good-for-nothing descendants send to the north for the same articles.

Beverly calls it a happy climate, near the same latitude of the land of promise.

Judea full of rivers: so is Virginia!

Palestine possessed a great bay and sea: so does Virginia—a fertile soil: so does Virginia. And mine [author] concludes that where the Creator is merciful enough to work for people, they never work for themselves.

He adds that Virginia lies in the same latitude with Canaan, Syria, Persia, India, China, Japan, the Morea, Spain, Portugal, and the Barbary States. But here follows the cap-sheaf of eulogy. "If people will be persuaded to be temperate and take due care of themselves I believe it is as healthy a country as any under heaven; but the extraordinary pleasantness of the weather, and the goodness of the fruit, lead people into many temptations. The clearness and brightness of the sky, add new vigor to their spirits, and perfectly remove all splenetick and sullen thoughts. Here they enjoy all the benefits of a warm sun, and by their shady groves are protected from its inconvenience. Here all their senses are entertained with an endless succession of native pleasures. Their eyes are ravished with the beauties of naked nature. Their ears are serenaded with the perpetual murmur of brooks and the thorough-bass which the wind plays when it wantons through the trees—the merry birds too join their pleasing notes, to this rural *consort*, especially the mock-birds who love society so well, that whenever they see mankind, they will perch upon a twig very near them, and sing the sweetest wild airs in the world; but what is most remarkable in these melodious animals, they will frequently fly at small distances, before a traveller, warbling out their notes several miles on end, and by their musick make a man forget the fatigues of his journey. Their taste is regaled with the most delicious fruits, which without art, they have in great variety and perfection. And their smell is refreshed with an eternal fragrancy of flowers and sweets—with which nature perfumes and adorns the woods almost the whole year round. Spring and fall in Virginia afford as pleasant weather as Mahomet promised in his paradise."

C. CAMPBELL.

Somerville, Ala. Sept. 10, 1835.

[The foregoing notes gathered by our friend and correspondent from old authors, will probably be new as well as amusing to much the greater number of our readers. We had long ago marked, for future publication in this journal, the whole of the descriptive part of the account of Virginia, by its true founder, John Smith—and it has been prevented by the want of vacant space for so long an extract—the great care necessary to copy faithfully its ill spelled old English —and also by an unwillingness to dismember a work which deserves so well to be given entire. It is a work not only curious and valuable for its manner and subjects, but as being written by one of the most remarkable men who have ever lived. A modern edition (of few copies, and therefore of high price,) of Smith's "Trve Travels, Adventures, &c." was published (in Richmond) and at a loss, as we are sorry to learn. If the demand of individual purchasers cannot induce, or pay for, re-publications of these old historians of our country, the object well deserves the patronage of the government of Virginia. A few thousand dollars would serve to publish cheap, but perfect editions of Smith, Beverly and Stith—which are now known to very few; and indeed the two latter would be lost, except for being preserved in a few public or private libraries.]

LARGE PRODUCTS OF SMALL FARMING.

To the Editor of the Farmers' Register.

While you are crowded with communications from *men*, upon the all important subject of agriculture, I hope you will pardon the intrusion I hereby make in detailing the following crop, made by a Chesterfield *plough boy*.

I was left, at the tender age of 15 years, by the death of my father, the sole care and support of my mother and six children, all younger than myself. At my father's sale all his servants were hired out, and I hired one—for keeping which, I was allowed by the estate $23. The only service he was able to render, was to keep us in fire wood and weed the garden. The sale took place at Cobb's on the 14th of April 1825, at which time, I had about three days ploughing done. The reason of my lateness was, that I expected to move away, and only decided to stay about the 1st of April. My stock consisted of a colt, three years old, two young cows, one sow with six young pigs, a yoke of oxen, two carts, two ploughs, one wooden harrow, three hoes and one spade. My provender being scant, I resolved to help it out, by a grazing lot, and accordingly fenced in one of one acre of clover, and thus equipped, I commenced my crop. I listed up seventy-five to eighty thousand corn-hills of land, crossed it with a trowel hoe, and my little brother, five years and six months old, and two sisters, older than myself, planted the corn while I ploughed. I had besides, a horse and plough one day, and two hands to plant after it, which was all the help I had during the crop.

I laid off one and a half acres and planted it in sweet potatoes, cotton, Irish potatoes, melons, and other necessary vegetables. I broke up the balks between the corn while it came up. My kind and friendly neighbors proved Job's comforters to me: for all predicted my failure. * * My plan for working and feeding was formed by necessity. Knowing that if I did no more work than my neighbors I should be "run away with grass" I fed the horse on corn after, or at night, and as soon as it was eaten I put him in the clover lot. As soon as it was light enough to see, I hitched up and drove briskly until breakfast time—took out and fed while I ate, and for which I only allowed forty-five minutes—worked till one o'clock —rested an hour and a half when cool, two hours when warm—when very warm, two hours and a half, sometimes three hours. I would then hitch up again and drive as long as I could see to keep off of the corn. I cultivated my crop entirely with the plough, rejecting the hoe, except to replant, from necessity. I soon saw that my corn outstripped that of my neighbors. I looked on with astonishment. I laid by my crop with the dagon plough, and had finished to about eighteen thousand hills, when the weather grew dry, and at the earnest entreaty of my neighbors, who saw the corn twist up after every furrow, I stopped; and thus I found by listening to them, much against my own judgement, I only made about two-thirds as much on that part, as I did on the other, besides the loss of much fodder, as that fired, while the rest kept green even to the last furrow.

I began to use my new corn about the 10th of September. The hogs got into the field and destroyed about four barrels. After using from it all fall and winter plentifully, and fattening six shoats, it turned out as follows:

Sold at the door 20 barrels at $3¼	$65 00
" " 20 " " 4	80 00
Petersburg 15 " " 4½	67 50
" " 13 " " 5	85 00
" " 5 " " 6	30 00
I raised 200 lbs. of cotton, for which I got 25 cents per lb.	50 00
Got for fodder, tops and shucks	53 00
150 bush. sweet potatoes at 40 cts.	60 00
Six shoat were worth - -	21 60
Sold melons, turnips, &c., which brought me - - -	20 00
Bought 10 bushels wheat at 75 cts., and seeded it—and sold it at $1, and the same for seeding, and made by the job, net - -	12 50
	544 60

From which, deduct hand hire for getting fodder, - - -	10 60
	$534 00

The time I was employed about it was about seven months, and my labor yielded me at the rate of, or about, seventy-six dollars per month. I do often fondly look back upon that year, and all looks like the work of magic. Truly the God of nature was with me, though I knew it not.

N. B. My Irish potatoes turned out less than the seed I planted. I thought that the more I ploughed and worked them the more I would make, and consequently, worked them about eight times, and found, to my astonishment, that I had the finest vines I ever saw, but no potatoes larger than a partridge egg, or thereabouts—and they few and far between.

J. L.

ANOTHER COLT FROM A MULE. MARL AND MARLED LANDS.

To the Editor of the Farmers' Register.

Spring Hill, Nansemond County, 17th Sept., 1835.

Permit me to record in your Register, the birth of a second mule colt of mine, on the 13th of August, 1835. The same mule brought a fine female colt, jet black, save a star in its forehead, and one foot white. It partakes, as did the other, more of the horse than of the mule, and is a much finer colt. It can be seen in my pasture by any and every one.

I really should like to be informed by you, how it is that you have made such good corn, as I saw the other day, in that old field just above Mrs. Gary's: I suppose by marl and proper management.*

Last fall I sent to Baltimore for 30 bushels of wheat to seed 30 acres of land, 20 clover lay and 10 after oats. I got but 24, and fearing that I should not have enough, I directed my old man to make it hold out. He only sowed 21 bushels, and I made this year therefrom, near 500 bushels. The clover lay averaging 20 to the acre, and the oat land not 10; so that you see, I made about 25 bushels for one bushel sowed. This wheat has been made, first, by the use of marl, then some manure, which produced the clover, and finally, the wheat has been made. Twelve years ago this land would not have produced five bushels of wheat to the acre. It not only now produces wheat, but every thing else in proportion. Yes, sir, and such are the means within the reach of many, very many persons in old Nansemond, to improve their worn out land; and believe me, they discard them. I do not mean *all*—for we have some few noble spirits in the good old cause of improving the soil—and would to God that we had more; for our whole tide water country is filled with marl, more or less deep under the earth. Several years ago, in digging a well in the Dismal Swamp, eight feet below the surface, a fine bed of marl was entered. It is evident to me, that our whole country abounds in it more or less; and that it is of use, when properly applied, I think no rational man will gainsay, but it requires great exertions to bring it into use. A circumstance happened in my neighborhood of more service to our cause, than all the talking that you and I could do. Many of my neighbors had been laughing at me for years, when at last, I prevailed on one of them, a very amiable man, but very poor, to use a little marl upon his poor old field. It made such a difference in the crop, that all became at once convinced, and are now trying to get it. Sir, we must improve our lands, and as *we* have the means of doing it, why should we leave our native country, for the south and the west? That country, or a large portion of it, must in time be worn out, and then there is no possible means of reclaiming it. It must be exhausted from the nature of things. So much is now made, that the proprietor or occupant of the soil, are flushed with success, and never stop to look what will be the result at a future day. But poor old Nansemond, that has heretofore stood at the lowest possible ebb, begins now to hold up her head. With some as fine land as any in the world, if the water was taken off, (and that is fast disappearing or lessening every year, from various causes,) with marl and lime all in reach, and ample means of acquiring manure—with easy means of access to good markets, and land very cheap, why should we, I say, go south or west? No! let those who dream and speculate in visions, go—let others, that I could name, go—but let those who live for others, as well as themselves, and who are desirous of improving the soil at home, remain. I, sir, do verily believe, (while I candidly confess that all my feelings are in the mountains of Virginia,) that the country from Suffolk to Norfolk will, in the course of time, be the garden spot of the union, so soon as the timber is gone, and the water removed, (which might easily be done, but the way I shall not here point out.) The timber is fast falling before the axe, and the water is fast disappearing. The health of the country will then improve—and with good land, the ample means of improvement, and a market at our door, why should not the country be filled up? It will—it must be. So, I say, with all my prejudices in the mountains, (for I am of mountain birth, or so near so as occasionally to feel the bracing north-west wind sweeping over those romantic hills, the beautiful scenery of which must delight any man, that is not dead to the feeling of all nature, and whose very soul is not wrapped up in the visionary schemes of the golden region—) I say, with all my feelings in the mountains, I am constrained, and must say, that we down here, (as Jack Downing would say—"down east,") have advantages that few possess. And already have our lands begun to attract the attention of some very well informed gentlemen—for they see clearly that while we have disadvantages, yet we have many, many advantages—and show me, sir, if you can, the place that has no disadvantages.

Before I close, I will tell you what a southern gentleman told me and others lately. He is a great advocate for all going south. He acknowledged that since he had been to the south (22 or 23 years,) that he had completely worn out his land

*By marl (and a light dressing) alone. There is by no means such a growth as to excite admiration, except upon the ground of the previous poverty of the land. Ed.

(then fresh) beyond the power of reclaiming, and that he had to look for other land. Now, sir, look on this, and look on that, and see how things will be at a future day. Success to you and your Register. I approve James Barbour's plan, of an agricultural convention.

JOHN THOMPSON KILBY.

RELATION OF PLANTS TO SOILS OF CERTAIN INGREDIENTS.

To the Editor of the Farmers' Register.

Newbern, (N. C.,) Oct. 8th, 1835.

I have just read with much interest your "Inquiry into the causes of the formation of Prairies," &c., contained in the number of the Farmers' Register for the present month. At page 323 of the number, you give the names of certain plants mentioned by Dr. Clarke as growing on the *steppes* of Russia, and you desire to be informed "whether these plants are confined to calcareous soils or not."

To this inquiry it is not in my power, at present, to give a satisfactory answer, having within reach but few works at all relating to the subject. The following statements are all that I can at present furnish, bearing on the question.

The plants mentioned in your notes, are the following:—*Centaurea frigida, Centaurea radiata, Crocus sativus, Geranium sylvaticum, Silene quadrifida, Sisybrium loeselii, Statice trigona, Stipa pennata.*

The United States, east of the Alleganies, afford not a single native species of *Centaurea*. The only species yet found in North America, was discovered by Mr. Nuttall in *Arkansas*, (I think) on whose *prairies* he reaped a rich botanical harvest about the year 1832, (I do not remember the exact date.) The species has been named *Centaurea Americana.* I cannot say that it was found on calcareous soil, or even in a prairie, not having seen any published account of it; but the probability is in favor of such a supposition. The genus *Centaurea* is nearly allied to the genus (*Carduus* or *Cnicus*) which is described as growing so luxuriantly on the *Pampas* of South America: and from my own observations, I think that this genus delights in a calcareous soil.

There is no native *Crocus* in North America, and I am unable to say what is its natural soil.

Of the genus *statice*, our two native species (*statice* armeria and *statice* caroliniana) grew in *saline* soils on the sea coast. This numerous genus is principally indigenous to the *sea coast* of the south of Europe. Probably excess of saline matter in the soil may be as hurtful to vegetation as excess of calcareous matter, and may be the cause of some of the denudated plains of Russia and Tartary, and also of some towards the south sources of the Arkansas and the Red River.

The most vigorous native *Silene* that I have seen, grew on a highly calcareous soil. Of the particular species mentioned, I know nothing.

The genus *Stipa* is by no means abundant in the Southern Atlantic States; but in "Upper Louisiana," according to Mr. Nuttall, (Genera, Vol. I. page 59,) "they appear in many places the prevailing herbage, communicating to the desert plains in autumn the coloring of harvest, called *payjonal* by the American Spaniards."

H. B. C.

[The testimony afforded above, so far as it goes, accords well with the positions taken in the essay referred to by our correspondent. The exception as to saline soils, had been there noticed, and given its due weight. It is to be lamented that botanists have heretofore paid so little attention to the chemical nature of the soils to which particular plants were limited. If they had suspected the uniform connexion, which we believe to subsist between certain plants and soils of a certain constitution, their researches would have been made more easy, and far more successful. There is so little of calcareous soil in the Atlantic slope of the United States, that if it is known that any plant is never found there, and is abundant in the west, and in Europe, there is strong presumption that the plant requires, and indicates a calcareous soil. In like manner, a knowledge of the constitution of the soil would of itself show that certain plants could not be found, however suitable the climate.]

CONSTITUENT PARTS OF DIFFERENT VEGETABLE SUBSTANCES.

[When taking an extract from the table of Saussure for the note at page 388 of this No. we remembered having seen this more minute and accurate statement in the *Traité de Chimie*, and wrote to our friend Prof. Rogers, who owns the copy of that work, for a copy of the table, which we are now enabled to insert, though out of the place for which it was designed.]

University of Virginia,
Oct. 18, 1835.

DEAR SIR—Your letter would have been promptly answered had it been in my power to procure Berzelius. The arrival of my books, delayed by accident on the river, has at length enabled me to attend to your request, and I take pleasure in sending herewith a copy of the table of the composition of the ashes of various kinds of wood, &c. translated and transcribed from the sixth volume of the *Traité de Chimie* of Berzelius.

These analyses were made by Berthier, one of the most skilful chemists living. Among the points of interest presented by these results, I would call your attention to the fact of *soda* being present in every case, as well as potash, though in most of the experiments, the two alkalies were only determined in the *aggregate.* In the instance of the Norwegian fir, where they were separately ascertained, the amount of soda greatly *exceeds* that of potash, a fact which Berzelius explains by referring to one of the striking geological features of the mountains of Norway. These are in many cases composed chiefly of Basalt, which contains soda in various forms of combination, and which is more readily converted into soil by the action of the weather, than the granite rocks of the country containing potash.

Your friend,

WM. B. ROGERS.

NAME OF SUBSTANCE BURNED.		100 parts of ashes contain		100 parts of the matter soluble in water contain							100 parts of the matter insoluble in water contain								Computed amount of phosphates.	
	Ashes in 100 parts of substance.	Matters *soluble* in water.	Matters *insoluble* in water.	Carbonic acid.	Sulphuric acid.	Muriatic acid.	Silicic Acid (Silex.)	Potash.	Soda.	Water.	Carbonic acid.	Phosphoric acid.	Silicic acid (Silex.)	Lime.	Magnesia.	Oxide of Iron.	Oxide of Manganese.	Carbon.	Phosphate of Lime.	Phosphate of Iron.
Charcoal of Oak, - - -	0.030	0.155	0.845	22.4	7.5	5.2	1.0	64.1			32.6	5.7	5.8	12.6	7.0	1.5	4.5		7.1	3.7
Wood of Oak, - - -	0.025	0.120	0.880	24.0	8.1	0.1	0.2	67.6			39.6	0.8	3.8	54.8	6.0				1.8	
Bark of Oak, - - -	0.060	0.050	0.950	23.2	6.0	0.7	0.	69.3			38.5		1.1	50.1		0.8	7.4	2.1		
Wood of Linden, - - -	0.050	0.108	0.892	27.42	7.53	1.80	1.61	60.64			39.8	2.8	2.0	51.8	2.2	0.1	0.6		5.4	2.5
Wood of Birch, - - -	0.010	0.160	0.840	17.0	2 3	0.2	1.0	79.5			31.0	4.3	5.5	52.2	3.0	0.5	3.5		7.3	1.25
Charcoal of Alder, - - -		0.188	0.812		6.6	0.3					31.0	7.7	5.0	50.2	2.5	3.6			3.45	9.00
Wood of Fir (*Pinus Abies*,) -	0.0083	0.500	0.500	13.5	6.9	0.0	2.0	28.2	41.5	7.9	21.5	1.8	13.0	27.2	8.7	22.3	5.5			3.00
Charcoal of Do. - -		0.257	0.743	30.2	3.1	0.3	1.0	65.4			23.0	4.2	8.0	39.8	1.4	14.1	6.0			6.3
Charcoal of Pine (*Pynus Sylvestris*,)	0.0124	0.136	0.864	20.75	12.	6.6	1.33	31.66	15.33		36.0	1,0	4.6	12.3	10.5	0.1	0.4	4.8	1.72	0.25
Wheat Bran, - - -	0.044	0.190	0.810	Trace	0.2	13.0	35.0	50				1.2	75.0	5.8		2.5		15.5		

The spaces are left vacant whenever the number appropriate to them has not been determined.

From the Petersburg Intelligencer.

COMMERCIAL.

We are indebted to a friend for the annexed statements of the export of staple articles of produce from Virginia for the year ending 30th ultimo.

EXPORT OF TOBACCO, STEMS, COTTON AND FLOUR, FROM VIRGINIA TO FOREIGN PORTS, FOR THE YEAR ENDING THE 30th OF SEPTEMBER, 1835.

	TOBACCO,	COTTON,	FLOUR,	STEMS,
London.	6878	81	10	-
Liverpool.	6918	15006	2000	-
Bristol.	1290	-	-	-
New Castle.	192	-	-	-
Glasgow.	671	2823	-	-
Leith.	283	-	-	-
Cowes, &c.	2943	100	-	154
Havre.	3661	1220	360	-
Bordeaux.	300	257	-	-
Marseilles	150	-	-	-
Bremen.	1077	359	-	909
Rotterdam.	758	101	-	288
Amsterdam.	30	-	-	282
Antwerp.	400	50	-	502
Gibraltar.	250	-	-	-
West Indies.	16	-	6282	-
Rio and a market.	2	-	62089	-
Total.	25,819 hhds.	19,897 bales	70,741 bbls.	2,135 hhds.

Exported from Virginia.

	Tobacco. Hhds.	Cotton. Bales.	Stems. Hhds.
In 1831	23,832	20,639	2,984
1832	27,056	31,950	5,556
1833	20,754	20,144	2,395
1834	25,408	31,045	2,170

Tobacco inspected in Virginia.

	Passed. Hhds.	Refused. Hhds.	Stock. 1st Oct.
In 1831	28,338	18,239	15,572
1832	21,753	15,846	11,950
1833	20,655	13,621	12,346
1834	20,640	14,857	11,591
1835	27,509	19,991	15,626

Statement of cotton for Virginia.

Stock on hand 1st October, 1834		450 bales.
Received up to 1st October, 1835		33,350
		33,800
Exported to foreign ports during the 12 months ending 30th ult.	19,897	
Exported coastwise for same period	8,000	
Manufactured in Virginia	5,400	
		33,297
Stock on hand 1st October, 1835		503 bales.

IMPROVEMENT OF WORN LAND BY CLOVER AND PLASTER.

To the Editor of the Farmers' Register.

Orange, Sept. 24, 1835.

As I think it the duty of every subscriber to your valuable journal to give some account of his method of farming, or improving his land, I will commence by giving you an account of the improvement of a piece of worn out land, which I purchased a few years ago, which at the time I got possession, would not bring more than one barrel of corn to the acre. I commenced by clearing up the land, and ditching where it was necessary, and making dams or stops across the gulleys, and then throwing into them all the brush, and a little wheat straw, or something to stop the dams, and retain the earth that would be otherwise carried off. I then ploughed the land deep, and seeded it in the month of March with oats and clover seed—and as soon as the seed came up, I plastered it with half a bushel of plaster, and the same quantity of ashes per acre. The crop of oats was a small one. The plaster and ashes were repeated the next spring upon the clover, and there was a fine growth. Great care was taken to have as little of this green crop destroyed as possible, allowing only a few beeves and calves to graze after the clover was in the head. A fine crop of clover was turned under the last of August, and the land seeded in wheat in October. The crop was between nine and ten bushels per acre. The next spring the land was plastered again in the same manner, and there was a fine growth of clover, which was very slightly grazed in the fall. The land was ploughed with three horses in the fall and winter, turning under a great quantity of vegetable matter, almost in a dry state. The land remained in that state until spring, when it was planted in corn—and although we had a drought, it produced five barrels of corn to the acre, and the land is nearly restored.

I will now give you some account of my system of farming, or rotation of crops, as I think my land has improved very fast under this course. It is to divide the farm into three fields, and several grass lots: say, for example, each field to contain 120 acres—80 acres to be in corn, and 40 acres of the poorest to be in clover, and fallowed for wheat—the next year the whole field, say 120 acres, in wheat—the third year in clover, which will complete the rotation. Or thus:

	FIRST FIELD.		SECOND FIELD.		THIRD FIELD.	
1st year,	80 acres in corn,	40 in clover,	80 in wheat after clover.	40 in wheat after clover.	80 in clover after wheat.	40 in clover after wheat.
2nd year,	80 in wheat after corn,	40 in wheat after clover,	Clover after wheat.	Clover,	80 in corn after clover,	Clover to fallow.
3rd year,	80 in clover,	40 in clover,	Corn after clover.	Clover for fallow,	Wheat after corn,	Wheat after fallow.

When the rotation commences again, that part of the field which remained in clover and was fallowed, will now be the best*—and should be in corn with 40 acres of the next best, leaving 40 acres of the poorest in clover to be fallowed again for wheat. The clover should always be plastered, and a proportion of ashes mixed with the plaster, and should only be partially grazed, leaving at least two-thirds of the clover to improve the land. To prevent grazing, I have besides my meadows, some clover lots, which as soon as the grass is sufficiently tall, is cut night and morning, and carted to the farm-yard to the cattle which are driven up from the woodland, where they browse on the buds through the day. They also have plenty of dry food, such as wheat straw and corn stalks, which are always put up securely when my corn is gathered. I also use every exertion to make as much manure as I can from wheat straw, corn stalks, &c. &c., the coarser parts of which I top dress my wheat and clover with. Indeed, I think to cover your young clover with the long manure, or wheat straw, is the most judicious method of using it, as it secures (with the use of plaster) a fine crop of clover, and I think a heavy crop of clover turned under in a green or dry state equal to any manure, (particularly of a dry season.) I have never failed in a crop of corn on a clover lay, especially if I can turn under the clover in the fall and winter, which I think important, as the cut worm is not so bad as they would be if the land was ploughed in the spring, and the clover would be in a state of decomposition, which would cause the corn to grow off very fast.

CATLETT CONWAY.

For the Farmers' Register.

COVERING CORN WITH THE HARROW.

Last spring, when the time for planting corn arrived, my land was very rough and much additional preparation was wanting. The ploughing, though generally deep enough, had not been either regularly or well executed, and the growth of clover and weeds had not been well covered. The extreme cold and wetness of the season had made much of the ploughing for corn late in the winter—and on the part broken early (and especially where badly ploughed,) the spear grasses were shooting up in spots. Under similar circumstances formerly, I have given a complete second ploughing before planting: but besides the great labor, this tears up the buried grass, and leaves the surface very rough. But besides this objection, this process was then out of the question, as owing to the measles then passing through nearly all my family of negroes, there was not more than half the proper force for work. I had long before tried covering seed corn, on well prepared land, with light harrows. But though the seed vegetated well enough, the plan had been abandoned on account of the surface being left too smooth, and thereby made more liable to be "baked" by heavy rains. The bad state of the land, and the want of hands to cover the seed with hoes, induced me to try large heavy square harrows, with straight teeth, such as were used to get in wheat on fallow land—each being a full draught for a pair of horses, and was generally drawn by four oxen. The corn rows were marked off, as usual, by a small trowel plough. the seeds dropped, and the land then harrowed flush, and thoroughly, as if the only object had been to put in order a rough and foul fallow. The process was the cheapest as well as the most effectual for getting the surface of the ground in decent condition, and the corn was as well covered, to insure its vegetation, as would have been by the usual slow and more costly method of covering seed. The harrow teeth cut deep, and not very close together, so that the surface was not merely scratched and smoothed, (as by light harrows,) and therefore the danger of "baking" was not incurred. This danger, however, would perhaps have been sufficiently removed by the layer of vegetable matter ploughed under.

Those who have never tried covering corn by the harrow, may suppose that the seeds would often be displaced. This evil could not have been incurred by me, as my corn (though planted on a flat surface) was designed to be ploughed only in one direction, and the harrows were drawn in the direction of the rows. But I do not believe that any notable disadvantage of this kind would be found under any circumstances. I always covered cotton seed with harrows, as the cheapest and

*Query—Is this great improvement of the poorest 40 acres known from experience, or is it a result expected, and resting only on opinion? If the former is meant, the fact is too important to have been left in doubt. Ed.

best method, without finding any evil of this kind—and certainly cotton seed would be more apt to be moved along by the straight tooth of a harrow, than corn. My opportunity did not permit me to estimate the saving of labor gained by this process—but there is no doubt of its having been very considerable, if the plan is considered merely as a substitute for covering the seed, besides all the benefit gained in putting the land in good condition for the growth, and after tillage, of the crop.

E. R.

For the Farmers' Register.

TO LESSEN THE COST OF RE-PLANTING CORN. REMEDIES FOR THE CUT WORM.

The re-planting in our corn fields, made necessary by the depredations of vermin of various kinds, and especially by the cut worm, is a serious evil to almost every farmer. The cut worm is most destructive on clover lands, or others not grazed, and particularly when the breaking up of the land for the crop of corn has been delayed until the latter part of the winter, or beginning of spring. Though I have rarely been a sufferer on account of late planting, it happened so this year. Owing to the excessive cold and wet winter, a part of my field could not be ploughed until late—and much the greater part of the first planting failed to stand. Without such uncommon cause of destruction, it may be safely counted on that the labor of re-planting and the transplanting of corn, on all farms not grazed, is not less than that of the first general planting—and the loss of crop, owing to the lateness of the products of such plantings, is of more amount than the cost of the labor.

The preparing of seed corn with tar, oil, sulphur and lime, as described page 22, Vol. I. Farmers' Register, should never be neglected, as a defence of greater or less value, against animals which devour the seeds. But heretofore no sufficient remedy has been made known, for the after destroyers of the young plants, among which the cut worm stands most prominent. Many remedies have been published—but early ploughing, (which cannot be effected in all seasons,) seems the only one of much value, and even that is but a partial defence. The various other remedies have either been too costly (even if effectual) or opposed to the improvement of the land, as is the case with the plan of burning off the vegetable matter.

A friend of mine who is a farmer of enlightened views and accurate observation, in Dinwiddie, lately informed me of his having this year made trial of putting drawn ashes mixed with gypsum to each hill or station of corn, according to the manner described at page 700, Vol. II. Farmers' Register. The crop appeared to him to be much improved by the application—though it falls *very far* short of the results which have been reported of a similar practice in Maryland. But what struck him more forcibly than the increased growth of crop, was that the corn so treated, stood remarkably well, while the other and adjacent corn, suffered much by the ravages of cut worms. The precise manner in which this benefit was produced had not occurred to him—nor did it to my mind, until after seeing the following passage in the last Tennessee Farmer, which states similar results of the like process.

"We are assured by a gentleman of our acquaintance, that during the last spring, he tried the following method on two fields in which the ravages of the cut worm threatened a total destruction of the crop, and that in both instances it was attended with complete success. As the application of this remedy will certainly produce an increase of crop, amply sufficient to compensate for the labor and expense of applying it, whatever may be its effect in preventing the ravages of the cut worm, we earnestly recommend to every farmer and planter to give it a full and fair trial. That the gypsum or plaster is highly beneficial in promoting the growth of the corn, we know from repeated experiments, but we presume, that the efficacy of the application in preventing the ravages of the cut worm is to be attributed to the ashes—lime would probably be equally, if not more effectual, in accomplishing the same object. The remedy recommended is the following:

"As soon as the corn is covered with earth, let a hand follow, having a bag hanging at his side, containing ashes and plaster mixed, one-third of the latter, and two-thirds of the former, or ashes alone, either leached or unleached—the latter would probably be preferable—and let him drop a handful on each hill of corn. We would recommend, where it can be obtained, the partial substitution of lime for ashes, in which case, to preserve the hands of the dropper from injury, it will be necessary for him to use a cup, shell, or gourd, with which to take up the lime—each bag should be large enough to contain as much of the substance used as the dropper can conveniently carry." ———"In our use of ashes and plaster, they were dropped on the seed corn and covered with it. The effect on the crop was decidedly and greatly beneficial. For preventing the ravages of the cut worm, there is good reason to believe, that it would be best to deposite the ashes on the hill after the corn is covered, and this mode will probably be found, nearly, if not quite as beneficial in increasing the crop."

It appears to me that the suggestion of substituting quicklime is well worthy of attention. A very small quantity of this substance, not making a tenth of the compound, would suffice—and a larger addition might be hurtful to the young plants. The lime, however, in the compounds used, was *mild*, and therefore not destructive of insects by its retaining a caustic or burning quality. Perhaps a still smaller quantity of salt, would also be serviceable. Both quicklime and salt are known to be destructive to many insects, and would aid the object in view, of keeping the cut worms away from the plants until out of danger. The Horticultural Register says that "fine salt sown immediately after seeds are put into the ground, at the rate of two bushels to the acre, will destroy grub worms." If so small a quantity of salt, sown broad-cast, could have such effect, (which may well be doubted,) as much benefit might be expected from the preventive action of a few grains' weight of salt applied close around the seeds. Even if the application of the mixture had no effect as manure, but served effectually to guard against this one enemy, the cost would be well remunerated. But there can be but little doubt of causing besides enough increase of fertility, to make the application profitable on that score.

It may be deemed rather hasty in me to recommend practices which I have not yet tried. But my object is to induce others to make full trial next spring, as I propose to do, with the plaster and ashes in the proportions above stated—with ashes containing all their salts, or deprived of them by dripping or exposure—with the addition of quicklime, and of salt, separately and combined. Sufficient experiments I hope will be made, and the results made known through the Farmers' Register.

Having referred to the experiment of my friend made with ashes and plaster, for the effect in securing a better "stand" of the crop, it is proper to add some other particulars. The ashes were from old heaps lying about negroes' houses, long exposed to the weather. The gypsum did not exceed one-twentieth of the mixture, and seemed to have no effect, as no difference could be perceived between the effects of the mixture, and of ashes alone, the increase from both being judged by the eye to be less than 10 bushels to the acre, or 50 per cent. more than the land not so treated. The ashes (or the mixture) were used to cover the grain after dropping it, and in quantity as much as a large double handful at each place. This would probably have been too much, if the season had been dry--for the manured corn showed some tendency to "firing," in the intervals between rains, though it proceeded to no injurious extent.

E. R.

PROPOSED RAIL ROAD FROM LYNCHBURG TO ABINGDON.

[The following copy of a petition is circulating through the newspapers, without any mark of its origin or authority. But we give it a place here because it is believed to express the views of the people of Lynchburg, and of a large adjacent region, and which will be pressed by them on the Legislature of Virginia at the approaching session.]

To the General Assembly of the Commonwealth of Virginia.

"The petition of the undersigned citizens of the of most respectfully represents:

"That authority has been granted to establish a rail road between the cities of New Orleans and Nashville, by the legislature of Louisiana, with the consent of those states whose territory will be traversed by such road. Engineers have been actively engaged in surveying the proposed route, and have progressed so far as to justify the offering of proposals for contracts for constructing fifty miles of the road. When this work shall have been completed, five hundred and thirty-eight miles of the distance between the town of Lynchburg, on James River, and the city of New Orleans, will remain, and on which, when a similar road shall have been made, there will be a continued line of rail road from the waters of the James River to those of the Mississippi.

"A considerable part of this distance lies within the borders of Virginia, and your petitioners respectfully pray the General Assembly of Virginia, to incorporate a company for the purpose of constructing a rail road from the town of Lynchburg, by Buford's Gap in the Blue Ridge of Mountains, to some point on the Tennessee line, with the purpose of uniting the same with such rail road as the Legislature of Tennessee, may direct, or authorise to be formed from Nashville to the Virginia line. Your petitioners further pray, that the privilege be granted to such incorporated company, or to the James River and Kanawha Company, of extending a similar road from Lynchburg to the city of Richmond, so as to intersect and be connected with the Richmond and Fredericksburg Rail Road.

"The great and obvious advantages which flow from the undertaking in question, and its execution as promptly as the resources of the country will justify, are generally acknowledged. By it a continuous line of rail road will be at no remote period made from the city of New Orleans to the city of Boston, passing through the heart of this Commonwealth, near to her finest river and greatest public work, and her capital. The numerous passengers which such a rapid and convenient mode of transportation will necessarily tempt within the limits of the state, must bring with them great benefits. Such a thoroughfare, uninterrupted as it must be by any competing route, will introduce much wealth on its borders. To the company, and the community, it will be found a most profitable investment. The tract of country through which the proposed road will pass, is one of the most fertile in soil, and abundant in mineral products within the United States, and possessing the inestimable advantage of being blessed with a climate of great salubrity. The contemplated road will open an easy communication from the interior of a vast, rich and populous country, to cities convenient to navigation, and where the trade may seek transportation by sea vessels, while it will enhance the value of the productions of the farmers, and contribute to the rapid growth of the cities. It will serve to give a sure and rapid means of conveyance to travellers, and the mails, to and from the most distant parts of the republic, and will contribute largely to the increase of the profits of the James River and Kanawha Company, by drawing thereto the transportation of domestic produce and foreign goods of much bulk, between the town of Lynchburg and the city of Richmond. Believing that these obvious and numerous benefits to the state, from the formation of such a road as that proposed by your petitioners, will be generally acknowledged, they forbear a minute enumeration of others, and content themselves with the expression of the confident opinion, that funds adequate to this great object can readily be obtained, and with praying that the general assembly will pass an act to incorporate a company for the purpose aforesaid, and to authorise books, under the superintendence of suitable commissioners, to be opened at such places as may seem proper, for receiving subscriptions in such company; and they will ever pray, &c."

From the Fredericksburg Arena.

CHESAPEAKE AND OHIO CANAL.

We have recently had an opportunity of inspecting the Chesapeake and Ohio canal, from Georgetown to Harper's Ferry, and take the earliest opportunity of expressing the admiration which a sight of that magnificent improvement necessarily inspires. It is unique. There is no canal in this country—nor, we believe, in Europe—of any thing like the length, which approaches it in dimensions. In comparison, the Hudson and Erie canal is a mill race. Nor is admiration confined to its vast dimensions:—the difficulties surmounted; the rugged country through which it passes; the solid and beautiful masonry of the locks and acqueducts; all conspire to impress upon the traveller a high sense of the engineers and of the enterprise of the company, which has persevered in the work, under so many appalling difficulties.

We left Georgetown, about half past 6 A. M. in the tri-weekly packet boat, drawn by two, and sometimes three horses. The boat was built by the canal company, and only temporarily used by the packet company, and was far too large for the business. We were carried along, nevertheless, at the rate of 6 miles per hour—a rate which was reduced, however, on the average, by the stoppage occasioned by two and thirty locks in 62 miles. The packet company has, by this time, two smaller and better constructed boats afloat, by which a daily line will be kept up. We have alluded to the locks and acqueducts. We cannot specify as to the former: for all seemed equally neat and substantial, and built—as is indeed the whole work—for posterity. The acqueducts over Seneca and Monocacy creeks are perhaps not exceeded by any thing in the country, for beauty and lightness of design and solidity of construction. The wilderness of the scenery around setts off to greater advantage the triumphs of art over nature.

It is, however, from the Point of Rocks to Harper's Ferry—12 miles—the greatest difficulties have been encountered. For this distance the Baltimore and Ohio Rail Road runs parallel to, and in contact with the canal—the bank of the latter forming the bed of the former. Both works are carried, for miles, under precipitous crags, impending many hundred feet above you, and whose very foundations have been cut away to form a shell for the road, while the canal is made to encroach on the bed of the river. The scenery itself is grand and imposing, and when viewed in connection with the monuments of human genius and perseverance which are seen at the base of the cliffs, it assumes the character of sublimity. He must indeed have a dull spirit, who carried along by boat or car, can view it unmoved. We have rarely experienced feelings akin to those we felt, on a fine morning, seated on the top of the car, and whirled along at the rate of 10 miles per hour along side, and under these tremendous precipices. We could, for miles, have touched with the hand the walls of everlasting granite, and not seldom was the perpendicular view of the sky actually obscured by the jutting out of the crag. This is a part of the rail road, on which the use of steam is prohibited by stipulation with the canal company.

The canal is finished as high up as Williamsport, about 104 miles from Georgetown, and is now under contract from the former point to Cumberland. In another year and a half the coal of the Alleghany will find a market in the eastern cities.

The rail road—that is the Baltimore and Ohio Road—terminates at the Ferry. On the other side commences the Potomac and Winchester Road, now nearly finished. The works are to be united by a viaduct, built at the expense of the former company. Baltimore will thus have, in a few weeks, a direct communication with one of the most populous, fertile, and wealthy sections of our state.

ADVICE WANTED, AND COMMENTS THEREON.

——— *County, Va.,* ——— 1835.

Dear Sir:

As I am a stranger to you, and not a subscriber to the Register, the following information is requested with becoming diffidence: though I am emboldened to do so from a belief that you are desirous of imparting to every one the best information touching the agricultural interest. Therefore, without further comment, I will first state that I am the owner of a farm on the banks of the ——— river immediately below the mouth of ——— creek. The banks of the river, on my land, as well as the ravines, abound in shell marl, the quality of which, I am induced to believe, is of the best kind. There are also strong reasons to conclude that the green sand marl, (such as is described in the Register, May No.) exist in strata among it. Now I am desirous of commencing to improve (immediately) by means of this marl, and must request the favor of an answer, directing in as few words as possible, the most approved mode of its application—the time when—the quantity, &c., &c. to be applied. I do not expect you to be exact, but that you give me the best idea by general remark.

Having understood that you are supplied with a chemical apparatus, and are in the habit of analyzing all calcareous substances, [I have] the thought of putting up portions of the different kinds of marl on my land, as also portions of the different kinds of earth, and while in Richmond this winter, to pay you a visit for the purpose of getting further information, that I may prosecute the contemplated improvement upon scientific principles, when I shall become a subscriber to your invaluable Register. For the above requested information I shall be your obliged and obedient servant,

———

N. B. I hope (under the circumstances) you will excuse the liberty I have taken.

[The foregoing letter is an amusing example of the frequent and heavy demands made on our time and labor, for objects of very small importance to the applicants, and of none whatever to any other person. This, it is true, presents an unusually strong case: but there are other persons, who though also total strangers, and not even subscribers, have made applications of very similar character, as if they thought that we had nothing else to do, and no greater pleasure to seek, than to comply with their wishes, and answer their inquiries, severally and specially. After suppressing merely the names which would identify the writer, we have taken the liberty to publish this letter, and will use the occasion to answer all similar applications—and some of which have been pressed more than once on our attention.

If we were to answer the demands (present and threatened hereafter) of the unknown gentleman who wrote the above letter, it might occupy more than a week of our time and labor, and then would furnish a very meager and unsatisfactory body of instruction—and of far less value in every respect than the result of our labors of this kind already laid before the public, and which Mr. ——— might have bought if he had chosen, for 50 cents. We can have no motive for incurring so much trouble to comply with these demands, present or to come, except the distant prospect held out above, that after all the service has been performed, the writer may *possibly* subscribe for the Farmers' Register—and that inducement even if multiplied twenty-fold, is not sufficient to engage the services required, with such unbecoming diffidence."

When the eccentric Dr. Abernethy was waited on and consulted by persons suffering under disorders of the stomach, on which he had published a treatise, he would often for his guinea fee return a shilling, with only the advice, "Take this and buy my book, and you will find in it all that I can tell you." If we may be excused for copying the manner of this great man, we would reply (but without a prescription fee) in the same words, to those who ask such advice as the above.]

TUNICATA CORN.

To the Editor of the Farmers' Register.

Columbia, (S. C.) Sept. 26th, 1835.

I send you a few grains of a curious kind of corn. It may not be a stranger to you; for I have known it for three or four years, and though strange, it is not, that I know of, of any particular advantage to the cultivator of it. It is possible that its particular utility may yet be found out. The few grains enclosed in this letter were taken from one of the common ears, which, when looked upon with the shuck on, appear exactly like any other kind of common corn: but, as you see, each grain is, besides the external shuck that envelopes the whole ear, wrapped up each in a shuck to itself; and so is the case with every grain of the ear. It must be a very precious grain, that Dame Nature takes such special care in protecting it. The ears are of the usual size and appearance. This corn has, however, another peculiarity, which is, that almost every tassel is also furnished with grain. I send you, about the 10th or 15th part of one of the tassels, or small blossoms with the grains on. You will observe that the grains of the tassels are all round. I intend to plant a few grains of it to see what it will come to, and if it will produce the same kind of corn as the grain from the ears. I should like very much to have an opportunity of sending you a full ear and a full tassel of it.

N. HERBEMONT.

[This corn (though larger) is of the kind described at page 75, Vol. II., as the Tunicata, a product of Paraguay, and supposed to be the original kind, from which all the numerous varieties of corn have proceeded. Each branch of the tassel of this, as appears from the portion sent by Mr. Herbemont, approaches somewhat in form to a head of wheat or rye, many of the receptacles for the fecundating farina enclosing perfect grains.]

FACTS WANTING.

We take the liberty of reminding all of the many practical farmers who have heretofore contributed to our pages, (and would be glad if our wishes could operate on the far greater number who have *not* given any such aid—) that the Farmers' Register has latterly exhibited a deficiency of practical matter, or of facts, the result of observation or experiment—and we earnestly request that such deficiency may not be permitted long to remain. It is not that we undervalue pieces of general reasoning and speculation, or that we are not thankful for all contributions of that character. But if a comparison is to be made of the respective amounts of value, as operating on the community, there is no doubt of the superior influence and effect of statements of facts. The preference for such matter, with very many, unfortunately extends much too far—so far indeed, that *false facts* are permitted to have more weight than the most correct abstract or theoretical reasoning. Without justifying this degree of preference—or yielding our own preference for reasoning unsupported by facts, to apparent facts unsupported by reasoning—we repeat to our correspondents that their statements of useful practical results, however meagre and (taken separately) however trivial, will be more generally and attentively read, and will therefore have more beneficial effect, than perhaps any thing else that could be communicated. Hundreds of such useful facts have probably been observed and noted, even during the growth of the last crops—and hundreds of our readers could at once furnish still earlier observations of useful facts, which now remain on their memorandum books, or merely in their memory, useless to all but themselves. We hope that the next No. will show a more general disposition to draw on these resources—and that no new fact will be deemed too trifling to be communicated, if it was of any value to its observer, and is not generally known to others.

SEASON AND CROPS.

The commencement of cold weather, accompanied by killing frosts, was unusually early. Much growing tobacco has been injured or destroyed. The middle and latter parts of October were warm, while its early part and the last days of September were uncommonly cold. The season and state of the earth have been very favorable for putting in the seed wheat in good order and in good time—and the very early frosts may be considered as some security (if any can be at all relied on,) against the attacks of the Hessian Fly. No seed had suffered from weevil—and so far, every thing has favored the preparation for the next crop of wheat.

The crop of corn, notwithstanding the unusual luxuriance of growth, will (as we foretold in our remarks two months ago,) fall far short of the general expectation. At least, such is the report of crops in our neighborhood—and the effect may be inferred to be as general and uniform as was the cause, viz: the unusually moist weather of the summer. The price of corn (old) still keeps as high as $1.50 the barrel in the Richmond market—though some crops of new, near Williamsburg, (belonging to persons about to move out of the state,) have been engaged by purchasers at $2. Wheat has kept for the last month above $1.25—more of ten $1.30—and both red and white wheats, in the Richmond prices current of October 27th, are stated as high as $1.35. These are the best proofs of the very short crop, and of the delusive character of the many statements to the contrary which appeared in the newspapers.

THE FARMERS' REGISTER.

VOL. III. DECEMBER, 1835. No. 8.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

TREATISE ON IRRIGATION.

Extracted from the Practical Irrigator and Drainer.

By GEORGE STEVENS.

[Concluded from p. 408 Vol. III.]

Although the formation of this meadow has been very expensive, there can be no doubt as to the success, if a regular management be carried on.*

Another water meadow was made the same year at Craighlaw, the property of W. C. Hamilton, Esq., and one near Creetown, for Major Campbell, with a small experimental one at Castlewig, belonging to Hugh Hawthorn, Esq.

The formation of these meadows not being finished till late in the season, the first crop could not be expected to be great; however, there can be no doubt as to their future success, if properly managed.

I have been favored with the following short statement of the success of irrigation in Aberdeenshire, by Mr. John Boulton, land surveyor:—

"The extent of land that has been irrigated under my direction in this county is, viz. for James Ferguson, Esq. of Pitfour, ninety English acres, of all kinds of soils. The land, previous to its being made into water meadow, was valued at from 7s. to 15s. per acre of yearly rent; the expense of cutting feeders and drains, &c. was from £2 to £14 per acre; and the increased value by irrigation has been from £2 10s. to £4 per acre. Since the introduction of the system at Pitfour, I have made many other water meadows, both for tenants and proprietors, which have succeeded equally with the first mentioned."†

Captain Aytoun has had the goodness to favor me with the following interesting account of Miss Rutherford's water meadows at Glendevon, and with a letter from the Rev. John Brown, minister of Glendevon, showing the comparative value of the same kind of land, under a regular rotation of cropping:—

"*Dear Sir*—As you have requested me to give you an account of the produce of Miss Rutherford's water meadows at Glendevon, and an estimate of the return made by them, as well as for the expense of formation, I shall endeavor to do so as well as I can. I must say, however, that if you insert this statement in the new edition of your work, I should like your readers to understand that I do not pretend to any knowledge of agriculture, and that, therefore, it is only the facts which I shall state, relative to the produce and the expense of forming the meadows, which can be entitled to any weight, and that my conclusions from those facts may very possibly be erroneous.

"Miss Rutherford has already formed two meadows, one of which is watered by the Devon, and measures about nine Scotch acres; the other contains two acres, and is watered by a small brook. The large meadow was formed, according to your directions, into beds, forty feet broad, raised about twelve inches in the crown. As the turf of this meadow was too tender to be lifted, the ground was ploughed several times, and then formed by the spade and barrow into bed-work.

"It was sown with grass seeds about the 20th June 1827, and, after being watered during the ensuing winter, produced a crop of three hundred stone an acre of the finest hay, which was lodged in the barn-yard by the 1st of July 1828. The turf of the small meadow was lifted, and, after the ground had been ploughed and levelled for catch-work, was replaced in the usual manner. This meadow also produced about three hundred stone an acre of very fine hay; but as the water was very deficient in the spring, it was not cut so soon as the other. After the hay was removed, the meadows were watered for about a fortnight, with the intermission of a few days at a time, and the grass sprang up with the greatest rapidity. On the 21st July, forty-three sheep and ten cattle were turned into the large meadow. The sheep were ready for the butcher by the 18th of August, and most of them were sold for 4s. 6d. more than they were worth (according to the shepherd's estimate) when they were turned in. From the 18th August the meadow was watered as before, till the 1st of September, when thirty-five sheep were turned in; but as they could not consume the grass, and as I was desirous of preparing in time for the autumnal floods, twenty more were put in on the 10th, and twenty-eight more on the 18th September, in order that the grass might be eaten quite bare, before the feeders should be cleaned out for the winter watering. The sheep were removed on the 1st October; but the waterman, being at that time busy with altering the conductor of the small meadow, watered the large one again, without cleaning out the feeders, &c.; and on the 18th October, sixty-seven sheep were turned into the meadow, in order to consume the grass produced by the last watering as quickly as possible, previous to the winter watering. On the 29th October the sheep were removed to allow the works to be cleaned, although the grass was by

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* I have made every inquiry to obtain a true statement of the quantity of last year's crop of hay; but the old lease of the farm being out, and the tenant not having got a new one, the hay was mixed (for reasons best known to the tenant) with other hay, by which means all my inquiry has been frustrated.

This being the first water meadow that has been made in the county, it has met with considerable opposition; but the proprietor, being fully determined to give it a fair trial, has appointed an experienced person to look after it through the irrigating season.

†The product of the Aberdeenshire meadows is very deficient, in comparison with what the water meadows produce in other parts of Scotland; which appears to me to be wholly owing to the water being spread over too large a surface—an error too often committed, and which it is very difficult to dissuade proprietors from practising.

Through the course of experience, I have always found that it is more advantageous to irrigate two acres well, than three indifferently.

no means so bare as it ought to be before the winter watering commences. The supply of water for the small meadow was very scanty for the whole summer; but, notwithstanding this disadvantage, it fed forty-three sheep from 21st July till 18th August; and, after being again watered, it kept ten milch cows from 15th September till 20th October.

"The soil of both those meadows is a very light sandy loam, about twelve inches thick, and lying upon a coarse gravel bottom of unknown depth. Glendevon being situated in the midst of the Ochil hills, the climate is severe during the winter, and the spring very late. The meadows are about seven hundred feet above the level of the sea. In such a climate, and at such a height, as far as I can judge, I should say that the ground, well laid down in grass, will give much more produce than it would do if ploughed for corn, &c.

"The rent paid in that part of the country for the best grass parks is £2 an acre, and in the hands of the proprietor it may be supposed to make a sum of about £3.

"However this may be, it is universally allowed by all the farmers in the neighborhood, that Miss Rutherford's meadows will be as valuable in pasture, after the hay is removed, as they were before they were watered. If this is the case, and I think the statement a very fair one, it is evident that, after deducting from the value of the hay the expense of making it and of the waterman's wages, &c., the remainder will show the return made for the capital expended on the improvement.

"The formation of the meadows cost exactly £20 an acre, and the average price of hay about Glendevon being 6d. a stone, the account will stand thus:—

To three hundred stone, at 6d.		£7 10 0
Deduct expense of making hay	£0 10 0	
——— repairing works, &c.	1 0 0	
		1 10 0
Clear produce per acre,		£6 0 0

which, being the return for the outlay of £20, is at the rate of thirty per cent.; and it ought to be observed, that the calculation proceeds upon the supposition that the produce is not to increase as the ground becomes richer and richer, in consequence of continued watering. On the other hand, however, I ought to mention that, although I could not perceive any error in the estimate which I had made of the profits of irrigation, still however I was so much astonished at the apparent result, that I was fearful lest I, like other sanguine projectors, had taken too favorable a view of the improvement, as I was sensible that if any error existed in my calculation, it could only proceed from my estimate of the former value of the ground, before it was formed into water meadows. I requested my friend Mr. Brown, the respected minister of Glendevon, to give me his opinion of the value of his glebe, which is situated close to the meadows, and the soil of which is of precisely the same nature. You will perceive by his letter, which I enclose, that, while he states that the aftergrass of the meadows is as valuable as the pasture formerly was, still he estimates the value of his ground, when under a rotation of crops, at £5 per acre.

"It must, however, be considered, that as Mr. Brown consumes the whole produce of his glebe in his own family, he returns a greater part of the crop to the ground than any farmer, with a moderate single farm, could possibly do, because the farmer must dispose of a very considerable portion of his crop. You will also perceive, that Mr. Brown purchases every year between three hundred and four hundred stone of hay, the whole of which, after being converted into manure, is applied to the arable part of his glebe, which contains only four acres; and that he does not charge any portion of the expense of this hay against the ground, which it appears to me he ought to do, as certainly, if he did not purchase that quantity of hay annually, and apply the manure it produces to the ground, he would not have such crops as he has. But, however this may be, Mr. Brown's estimate of the value of the ground ought to be much more relied on than mine; and I therefore request you will attach it to this statement, by which means your readers will be able to judge for themselves. If they should think with Mr. Brown, that, in that high situation and severe climate, a rotation of crops is more profitable than grazing, they will probably reduce the estimate which I have made of the result of irrigation to twenty per cent.; but if they should agree with me in thinking that grazing is the most profitable husbandry in a country like Glendevon, then I have no doubt that they will also agree with me in saying, that Miss Rutherford's profit upon the capital expended in forming her meadows is not less than thirty per cent. You are well aware of the peculiar difficulties which had to be overcome in forming the conductor for the large meadow; and it was owing to those peculiar difficulties that the expense of forming Miss Rutherford's meadows was so great.

I am, dear Sir,
Your obedient servant,
M. C. W. AYTOUN."

"*Glendevon, 2d Dec.* 1828.

"*My Dear Sir*—Your queries lead into a wide field, and require more experience than I have yet attained to, to answer them all. I shall, therefore, confine myself to that part which relates to the profit which the ground lying on the river side may afford to the cultivator. The soil is of no great depth, and rests on a gravel bottom. I have about four acres of this kind of land included in the glebe, and have managed them in the following manner:—

"After liming the whole, I took a crop of oats, then a green crop, after that a crop of barley sown with grass seeds; this was succeeded by a crop of hay, then oats, &c. as before. The produce from this management, on an average, was nearly as follows:—oats, from seven to eight bolls; potatoes, about sixty bolls, measured by the Linlithgow barley firlot, heaped; barley, six bolls; and hay, about two hundred stone. After deducting the seed, the produce may be stated as follows:—oats, six bolls, at 17s. per boll, £5 2s.; potatoes, fifty-six bolls, at 5s. per boll, £14; barley, five bolls, at 20s. per boll, £5; and hay, two hundred stone, at 6d. per stone, £5—the hay oftener above than below that price, the second cutting paying for the seed and making the hay. The whole free produce may amount to about £29. Should we allow £7 for the whole annual labor bestowed on the field, there will remain £22. I consider the above as nearly the average of each, and the average prices. The straw goes to make manure. I followed the above plan of culture for nearly thirty years; at this period the red clover failed, and the rest of the crops decreased in quantity, I limed again with Rescobie lime, thirty-six bolls of shells, barley measure, per Scotch acre. This produced a tolerable crop of clover the first year after the lime was laid on, but not equal to what the land produced when first limed. The second time the clover was sown on the land thus prepared, it appeared very thin and feeble in the stem, and, indeed, by the time of cutting the hay, it disappeared almost altogether.

"In this situation, I divided the field into six parts instead of four; by this method, after taking the same crops, I have two years' pasture. With this treatment, the cultivated crops will be improved, and no less will be produced by the pasture. I think four acres will still produce £20 yearly, after paying expenses of management. I would mention, that the green crop has the manure produced by one horse kept constantly in the stable, summer and winter, and two and sometimes three cows. To support these, I add annually to the fodder produced from the four acres, from three to four hundred stone of hay, which I purchase. The land you have laid under water is exactly of the same description, and, under the same management, would produce the same result. The hay produced on your watered field was equal to mine in quality, and exceeded it in quantity by one-half. The proportion yours bore to mine was as three to two, and the aftergrowth in your field was nearly, if not wholly, equal to what it would have produced when under pasture, before it was watered. Your shepherd said that the small field at Whitens produced nearly five times as much this year as it did in its former state; this is, I think, somewhat exaggerated, and it is scarcely a fair representation of it. This field was formerly under the plough, and, after being quite exhausted by tillage, it was left to produce such grass as was natural to the soil and climate. From this treatment, little produce could be expected. Had this little spot been cultivated with ordinary care, it would have produced a very different crop. When I saw C. Stewart, he could not inform me how many sheep the aftergrass would keep, as he had not then got the measurement of the field.

"The above is, I fear, but a lame and unsatisfactory answer to your queries, and conveys little information on the points referred to beyond what you are already in possession of. I rather think that some trial will be necessary before you can ascertain the extent of the improvement, and the benefit arising from it.

"The advantage, so far as yet appears, gives every promise that the plan will succeed, and that the profit arising from it will amply indemnify you for your present outlay. As far as I can judge, I think, by the method you have adopted, you will have the crop of hay beyond what the field formerly produced when under the ordinary system of pasturing; and a crop of hay in this sequestered glen is of more value than in the arable district of the country. Here the portion of arable ground is very limited in extent, and insufficient to answer the demands of the store-farmer: whatever tends to supply this deficiency, confers a very great benefit on the place. Your servant, after he gets the measurement, will be able to give you the remaining information to which your letter refers.

"By comparing the produce from the ordinary method of management with the produce your field yields under your new method, you will be able to ascertain exactly the profit resulting from your experiment.

I ever am,
My dear Sir,
Yours most sincerely,
JOHN BROWN."

Captain Aytoun,
No. 19, Coates Crescent,
Edinburgh.

As to the result of these statements, I leave the reader to judge; but, at the same time, I think it necessary to observe, that the making of the conductor to the large water meadow was attended with great difficulty, the greater part having been obliged to be cut through rock, which added considerably to the expense. By Captain Aytoun's account, three hundred stone of hay per acre is stated as the average crop, which is considerably too little, the water having been put on the meadow before the ground was properly swarded, therefore a much larger crop of hay might be expected when the land is properly replenished with natural plants; also the sum for keeping the works in repair, and superintending the regulating of the water through the watering season, is charged greatly too high, which mistake makes the profits of the water meadows much less than they otherwise would have been; whereas, on the other hand, Mr. Brown's system of cropping is calculated at the very highest rate.

We are told of the water of the Nile being so advantageous in agriculture, and of the watering system used in China and the East Indies for producing large crops of rice and Indian corn; but though we have no Delta to receive our rich streams, nor Indian corn nor rice, we have sandy soils and barren grass lands capable of receiving equal benefit with the lands of those so much boasted of countries, if the proper means were employed.

To elucidate this, we have only to examine the effects produced by the accidental overflowing of the Thames, Severn, Tay, Spey, and Clara river in Sweden,* which will sufficiently prove the above assertion, and show the value of the sys-

*The Clara river has its course in Norway, and, after having run nearly two hundred miles through the province of Wermland in Sweden, falls into the lake Wenern near Carlstad. This river is generally so much swelled by the melting of the snow in spring, that the water often rises fifteen feet in perpendicular height, overflowing all the low lands for many miles, which are mostly composed of fine sand. The greater the inundation is, the more fertilizing substance is left on the surface of the land, which acts as a manure, and produces large crops of oats and barley.

tem, without mentioning the astonishing effects produced by the common sewer water of the city of Edinburgh and other towns; but, were I to omit these interesting improvements, I should, by no means, do justice to the subject.

Immediately below the town of Maybole, in Ayrshire, a considerable extent of grass land, belonging to Quentin Kennedy, Esq., was partially irrigated with the common sewer water of that town, but, owing to the water being imperfectly distributed over the surface, the crops of hay and grass were very irregular. To obviate this defect, the proprietor caused the works to be remodelled under my direction, which, as will be seen from the subjoined letter, has been completely successful.*

Alexander M'Laurin, Esq. of Broich, was the first who collected the common sewer water of Crieff for irrigation. Mr. M'Laurin's meadow is regularly laid into catch-work beds. The soil is very porous, with a gravel sub-soil: the supply of water is very little, which makes the management difficult, the water being obliged to be changed from place to place very often. For the first two or three years, the irrigation did not succeed according to expectation, which made the proprietor think something must be wrong in the management. He therefore took the charge of changing and regulating the water himself, which completely confirmed his opinion that the fault lay altogether in the manager, for he has had no reason to complain ever since. The crops of grass and hay are constantly equal to his most sanguine expectations, being generally from three hundred and fifty to four hundred stone of hay, of the best quality, per acre.

Edinburgh has many advantages over the most of her sister cities; the large supply of excellent spring water is one of the greatest blessings to her numerous inhabitants, both in respect to household purposes and keeping the streets clean, as well as irrigating the extensive meadows situated below the town, by the rich stuff which it carries along in a state of semi-solution, where the art of man, with the common sewer water, has made sand hillocks produce riches far superior to any thing of the kind in the kingdom, or in any other country.

By this water, about two hundred acres of grass land, for the most part laid into catch-work meadow, are irrigated; whereof one hundred and thirty belong to W. H. Miller, Esq. of Craigintinny, and the remainder to the Earls of Haddington and Moray, and other proprietors. The meadows belonging to these noblemen, and part of the Craigintinny meadows, or what is called the old meadows, contain about fifty acres, and have been irrigated for nearly a century. They are by far the most valuable, on account of the long and continual accumulation of the rich sediment left by the water; indeed the water is so very rich, that the tenants of the meadows lying nearest the town have found it advisable to carry the common sewer water through deep ponds, into which the water deposites part of the superfluous manure before it runs over the ground. Although the formation of these meadows is irregular, and the management very imperfect, the effects of the water are astonishing: they produce crops of grass not to be equalled, being cut from four to six times a year, and the grass given green to milch cows.

The grass is let every year by public sale, in small patches of a quarter of an acre and upwards, and generally brings from £24 to £30 per acre per annum. In 1826, part of the Earl of Moray's meadow fetched £57 per acre per annum.

About forty acres of the Craigintinny lands were formed into catch-work water meadow before the year 1800, which comprises what is called Fillieside Bank old meadows, and is generally let at from £20 to £30 per acre per annum. In the spring of 1821, thirty acres of waste land, called the Freegate Whins, and ten acres of poor sandy soil, were levelled and formed into irrigated meadow, at an expense of £1000. The pasture of the Freegate Whins was let, previously to this improvement, for £40 per annum, and the ten acres for £60. They now bring from £15 to £20 per acre per annum, but may be much improved by judiciously laying out £200 more in better levelling that part next the sea, and carrying a larger supply of water to it, which might be easily done without prejudice to the other meadows.

This, perhaps, is one of the most beneficial agricultural improvements ever undertaken; for the whole of the Freegate Whins is composed of nothing but sand, deposited from time to time by the action of the waves of the sea. Never was £1000 more happily spent in agriculture; it not only required a common sewer to bring about this great change, but a resolution in the proprietor to launch out his capital on an experiment upon a soil of such a nature.

Since the making of the Freegate Whins into water meadows, Mr. Miller has levelled and formed forty acres more of his arable land into irrigated meadow, worth, before the formation, £9 per acre per annum. It will only require a few years before these meadows will be as productive as the former; for it is evident that the longer wa-

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*"*Lochlands, 3rd March*, 1832.

"SIR—It is with great pleasure I report to you the state of the meadow grounds in this quarter, which underwent the operations suggested by you. The convertion of the piece of ground in Bogton, occupied by myself, into water meadow, has completely succeeded, and realized your best expectations. From a piece of rough moss land, which previously yielded not more than fifty stones, it now produces not less than two hundred stones of hay per acre of good quality; and will, I am confident, continue to increase both in quality and productiveness. The other and adjoining portion of meadow has also, by means of the drainage, been greatly improved in the quality as well as the quantity of the grass. Again, as to the piece of ground in the adjacent farm of Dangerland, which was drained by your directions, the improvement in the quantity and the quality of its grass has not been less than on the piece of Bogton above alluded to. And, finally, the old meadows of Tannock and Dangerland, in the immediate neighborhood, the produce of which, previous to the drainage which you directed, was in many parts coarse and husky, now yield grass of a very improved quality. I consider that this last improvement is *also* to be attributed to the regulated mode of putting on and taking off the water prescribed in your instructions. I am confident that the whole improvements on these grounds will amply repay all the expense.

I am, dear Sir,

Yours truly,

JAMES KENNEDY."

ter is suffered to run over the surface of grass land, the greater quantity of fertilizing substance will be collected: therefore as the water is so very superior in quality to all other water, a speedy return for the capital laid out may be expected.

The expense of keeping these meadows in repair is from 10s. to 15s. per acre per annum, which is more than double the expense of keeping water meadows in repair in general, for the watering of them is not only through the winter season, but the water is put on them for one or two days together, immediately after every cutting of the grass, through the whole of the season.

One hundred and ten acres of Mr. Miller's meadows, in 1827, gave a clear profit of £2300.

Such specimens, one should imagine, will carry sufficient weight with them to turn the scale against any objection to the practice of irrigation, arising from a fear of expense, inferiority of soil, or poorness of water; which have always been the principal charges against the system, and, I am sorry to say, have prevented many proprietors from making the experiment. But it is sufficiently proven, that land of the worst quality, with the poorest water, under good management, in the highest districts of Tweeddale, after deducting the expense of keeping in repair, brings nearly £7 per acre per annum.

In 1828, a water meadow, consisting of nearly thirty acres, was commenced at Bertha, on the north side of the river Almond, for the Right Honorable Lord Lynedoch, and was completed the following year. The soil is partly alluvial, and partly gravel and sand, laid into natural ridges by the action of water. Previous to its being irrigated, the alluvial part produced tolerable good pasture, but the gravel and sand ridges were mostly covered with broom. The inequality of the surface would not permit its being formed into regular beds of either catch or bed-work irrigation; it is, consequently, made into a continued succession of both. It commands the whole of the water of the Almond after the manufactories and town of Perth are supplied, which, in droughty seasons, intercepts the whole; but although so situated, and the water running through a poor country, yet it contains a considerable quantity of enriching substance, whereby the land has already been improved three times its former value, and there is every reason to believe the value will still be increased considerably. Further particulars will be found in the annexed letter from the factor on the estate.*

During the period last mentioned, a catch-work meadow was made for the Honorable Lord Corehouse, consisting of a little more than five acres, partly by means of lifting the turf, levelling and pulverizing the soil, and laying down the turf again; and partly by ploughing and levelling the surface, and sowing it with natural grasses. The water used is of good quality, but rather scarce in droughty seasons. The grass of the meadow is cut twice a year; the first crop being generally made into hay, and the second given green to cattle. The produce of hay this year was nineteen hundred stones.

Another catch-work meadow was made in 1829 and 1830 at Dalquharran, the property of T. F. Kennedy, Esq., M. P. Its extent is about eight acres, of a gravelly sub-soil, and was prepared in the same manner as the last mentioned, at an expense from £4 to £9 per acre. It is formed into four parts, two on each side of the burn which runs through it; the water, after running over the two upper parts, is caught and carried over the two lower, and the whole being so arranged that any portion can be irrigated separately. No expense has been spared to make this meadow as complete a specimen as the nature and situation of the land would admit.

In a letter from the proprietor just received, (Nov. 7th, 1833) he says, the part first irrigated produces three hundred, and the second two hundred stones of hay per acre, worth, in general, 6d. per stone, and the aftergrass is worth 20s. per acre annually, and that he has not the least doubt but that within two years the latter will produce an equal quantity with the first.

Since the publication of the second edition of this work, I have been employed in making many other water meadows in this country, and in

*"*Lynedoch, 29th Feb.* 1832.

"Dear Sir—I had intended to send you a short account of Lord Lynedoch's water meadow last week, but several unforeseen occurrences have prevented me from doing so till now.

"The formation of this meadow was completed early in May 1829, and for the eight preceding years it was let for pasture at the average rent of £30 11s. 3d. The total cost of its formation was £320 10s. 7d., and the average annual expense of managing it for the last three years has been £17 17s. 5d.

"It is unnecessary to say any thing of the produce of this meadow in 1829, as those parts where cutting or forcing was necessary to bring it into form, were but imperfectly swarded when the crop was cut, and yielded nothing; but, upon the whole, I reckoned the crop worth double the average rent which the field produced while let for pasture.

"The crop of 1830 was put up in twenty-one ricks, nineteen of which were sold by auction on the 21st of December of that year for £89 16s. 6d. One of these ricks was selected as an average of the whole, and weighed, and from this I estimated the produce of the meadow at three thousand nine hundred stones tron, and the price at which it sold 6d. a stone. We had rather unfavorable weather for making the hay that year and it was not of the best quality. The aftermath was let for pasture, from the 22d August to the 15th October, for £12, so that the total produce of the meadow in 1830 was £109.

"In 1831, from a scarcity of water in the spring and early part of the summer, the crop was, as nearly as I could estimate it, about one-third less than that of the preceding year, or not exceeding two thousand seven hundred stones; but the quality of the hay was so much superior, that in value I do not consider it above one-fifth inferior to crop 1830.

"Our own sheep were turned into the meadow after the crops of 1829 and 1831 were carried, but I kept no account of their number, nor the time they were upon it, in either year.

"I do not think the meadow has yet come to its full bearing; on the contrary, it may reasonably be expected to produce considerably more than it has yet done; but even if it should continue to yield only at the rate it has done for the two last years, it must be held to be a profitable undertaking.

I am, dear Sir,
Yours sincerely,
WILLIAM GOODSMAN."

taking levels and making plans for the irrigation of several hundred acres belonging to different noblemen and gentlemen in Sweden; but from the numerous cases already mentioned, I consider it unnecessary to give any more examples, as from them the reader must be convinced of the great value of these improvements; I shall, therefore, conclude this essay with a short summary of the advantages to be derived from irrigation.

The crops on water meadows are produced at the least expense, and with the greatest certainty of an early return. On water meadows that are well managed, the grass is the earliest and of a superior quality, well adapted for the feeding of ewes and lambs;* and the hay, when properly made, is equal to the best clover hay, and superior to any other kind for milch cows. When the herbage of dry porous soils is impoverished for the want of moisture, and the rich spungy land by its remaining too long stagnant, both of these evils are remedied. Another great advantage attending irrigation, is the extra supply of manure it yields to the arable part of a farm, especially when the lands are lying (which is often the case) at so great a distance, that it is almost impossible to procure it for money.

The success of improving land by irrigation, perfectly warrants an experiment in the most unfavorable situation. The result will invariably triumph over every prejudice.

I will conclude this interesting subject with the following extract from Mr. Walter Blith's Survey of Husbandry Surveyed. London, 1653, 4to. (Page 25.)

"Thou hast also another great advantage hereby having water drawne over thy land, thou art in such a capacity that, in case of drought in time of summer, thou needest not to feare it. Thou mayest now and then wet over thy land in the heat thereof, where grasse, if it have but moysture, will grow far faster in so hot a time than any; but be sure not to soake thy ground too much: keepe thy land rather in a thirsting condition, not glutted ready to spew it up again, so mayest thou preserve thy land greene and fruitfull, when others are scorched all away, then may a weeke's grasse or a load of hay possibly be worth three or four.

"I myselfe, by these opportunities, have cut twenty-four load in a meadow, where I cut but five or six the year before, when hay sold at a great value. The directions exactly followed, I will lose my credit if thou faile of the effect promised."

INDIAN CORN MADE WITHOUT TILLAGE AFTER PLANTING.

To the Editor of the Farmers' Register.

By experiment, I have arrived at some conclusions in regard to the culture of Indian corn, which I think are of importance to planters in the southern states. I communicate them for the use of the public with great hesitation, because they are directly at variance with the received opinions on the subject.

The early part of my life was spent in agricultural pursuits—and hence, if there were no other reason, I feel a deep interest in every thing relating to agriculture. I noticed, very early, the great difficulty in transplanting successfully the young corn plants. Whence comes this, but from breaking the roots in taking the plant up? How is it then, that intelligent planters affirm the doctrine, that one chief object of ploughing corn, is to cut its roots? If breaking the roots of young corn in transplanting it, is really fatal to its future growth, must not breaking its roots with the plough, when it is older, and the season hotter, be a serious injury to it? Any other conclusion seems to me to be at variance with the general economy of nature. It seems to me that there can be, in truth, but two reasons for ploughing or hoeing corn—1st, to destroy grass and weeds—and 2nd, to keep the soil loose, that the roots may penetrate easily, in search of their proper food. But in accomplishing these two purposes, great injury must be done to the corn, by breaking its roots. Can we not accomplish both these ends, and at the same time keep clear of the attendant mischief? I think we can.

Last spring I planted a small piece of poor ground—first breaking it up well. The rows were made three feet apart, and the stalks left about a foot apart in the drill. The ground had been very foul last year with crab grass, whose seed matured. The corn was not well up this spring before the grass began to appear. When the corn had about four or five blades, the young grass completely covered the ground, and the corn was turning yellow. I spread a small quantity of stable manure around the corn, and covered the whole ground three or four inches deep with leaves from the forest, taking care to do this when the ground was wet, and the leaves also, that they might not be blown away, and to leave the tops of the young corn uncovered. In *ten days* there was not a particle of *living* grass to be found, and the corn had put on that deep blueish green, which always betokens a healthful condition of the plant.

From the day the corn was planted until after the fodder was pulled and the tops cut, nothing more was done with it, and the result is a product at the rate of *forty-two* bushels to the acre—about one-third of the stalks having two ears on each of them.

I noted, in the course of the summer, the following facts:—

1st. The corn treated thus, was always ahead of some planted along-side of it, and treated in the usual way.

2nd. It ripened at least ten days sooner than other corn, planted at the same time.

3d. During the hottest and dryest days the blades never twisted up, as did other corn in the neighborhood.

4th. In the dryest weather, on removing the leaves, the ground was found to be moist to the surface, and loose, as deep as it had been at first broken up.

5th. The heaviest rains had scarcely any effect in washing away the soil, or making it hard.

It certainly will require less labor to produce corn

* If the late Sir George Montgomery, Bart. of Magbichill, had not had recourse to his water meadows in the cold backward spring of 1826, his numerous flocks would undoubtedly have starved; but by putting them on the water meadows from the middle of April to the first of May, he not only preserved the most of his lambs from perishing, but, in the same year, cut nearly three hundred stone of hay per acre.

in this way, than in the usual mode. And even if it required more, we have the consolation to know, that while, by the old mode, every hour's work is an injury to the land, by this mode, every hour's work is making the land better; for few things can be better manure than the coating of leaves put on in summer, when ploughed in the winter or spring following.

I used leaves raked up in the forest, because of these there is an ample supply within the reach of almost every person—and because there seems, from my observation, to be a strong antipathy between dead and decaying forest leaves, and crab grass, that most harassing foe of agriculturists.

I make this communication, as I have already said, with hesitation, because the idea of raising corn without ploughing and hoeing, and at the same time improving the land, by protecting it against the influence of a scorching sun and washing rains, is so directly in the teeth of the universal practice for ages. The thing is, however, at least, worthy of further trial. It *may* lead to most important results. Those who think the plan worth any attention, may easily make an experiment with an acre or two, and note carefully its progress through the summer. If they are satisfied, after the trial, that there is any thing in it, to extend the operation will not be a difficult matter.

If, on experiment, it should be found advisable to extend the operation, the proper way would be, I think, to collect the leaves in winter, and deposite them in heaps on the ground on which they are to be used, and the next spring, during a wet season, after the corn is up, spread them, taking care to leave the tops of the young corn uncovered.

There is one very important result that must follow the success of this plan on a large scale—and it was with an eye chiefly to that result, that my experiment was undertaken. The constant excuse for not improving our land, is, that where cotton is grown, the time necessary, first to cultivate the growing crop properly—next to gather it, and then to prepare for a new crop, leaves the planter no time to collect manure. My plan will put an end to that excuse at once; for wherever leaves are to be had, half the time usually bestowed on working the corn crop in the usual way, spent in gathering leaves and putting them on the ground, instead of ploughing it, *may* in a short time, accomplish every thing that can be desired in the way of manuring.

Why may not the same process answer in the cultivation of cotton? If it keeps the ground soft and moist, and prevents the growth of grass and weeds in a corn crop, it will surely have the same effect with cotton—and be the means, further, of preserving the cotton, when the bolls open, from all the injury it sustains from the soil in wet seasons.

This is, however, but speculation. Let it be tested by actual experiment.

JAMES CAMAK.

Athens, Ga. Oct., 10, 1835.

For the Farmers' Register.

"FENCE LESS" AND THE EDITOR OF THE REGISTER,

Have each mistaken the import of our remarks with regard to the law of enclosures. We shall therefore with the permission of these gentlemen, endeavor to make ourselves better understood. When we asserted [p. 47, Vol. III.] that agricultural reform called for no legislative enactment, we had some reason to feel assured that the tenor of our remarks would have exempted us from the charge of maintaining the good policy of the law. And the editor will recollect that the caption to the article we offered, was his own. The one proposed was simply, "remarks upon the existing law of enclosures," or something equivalent.

We distinctly admitted the necessity of agricultural reform, when we pointed out what we considered the most approved method of stock management. The connexion of this subject with profitable husbandry, is so well understood, that we deemed it unnecessary to offer any argument to prove it. And we were not a little surprised that the editor should deny he was called upon to discuss this particular question: particularly after the publication of an article from an English agricultural paper, from which we make the following extract: "Agriculture is divided into three great branches, *green cropping*, *white cropping*, and *stock management;* and they are mutually and severally dependent for success on each other. Without green cropping we cannot raise heavy crops of grain, and without great crops of grain, and consequently of straw, to be used as litter, and partly as fodder in conjunction with the green food for feeding stock through the winter months, we cannot make dung, and without plenty of dung we cannot raise green crops, and so on. And it is such a disposition of stock and crop as shall cause the one to be instrumental in promoting the prosperity of the other. A reciprocity of services, as it were, which ultimately converge to the general advancement of the whole, which in agriculture, constitutes a system, which system must be rigidly adhered to if any thing like *profit* is to be looked for in farming." (*F. R. Vol. I. p.* 674.)

There are two ways of effecting agricultural reform—the one by legislation—and the other by individual enterprise. We are opposed to the legislature's interfering with this subject, for the following reasons. The present system of agriculture in Virginia, although as bad as it well can be, has become, by long usage, identified with the very constitution of society. This system is based upon the legal policy of enclosures—and whenever this law is repealed, the whole superstructure must tumble, and involve thousands in pecuniary distress. We know that this consequence will be denied. But we defy gentlemen to point out a single instance where force has been used to divert the labor of a nation from one channel into another without producing great pecuniary sacrifices. It is difficult in this particular case to point out the precise manner in which the loss would be sustained, because the nature and amount of this loss would depend very much upon the peculiar circumstances of the individual. But innumerable instances might be found in every part of the state in which injury would unquestionably be sustained by repealing the law. According to this view of the subject, we are limited to a choice of evils. On the one hand, the law of enclosures is unjust in principle, and oppressive in its operation. On the other, its repeal would be attended, necessarily, with great pecuniary sacrifices. In our opinion, this difficulty may be avoided by leaving the subject wholly to individual enterprise. We pointed out upon a former occasion, the manner of effecting the desired change. And we referred to instances where it was effected with signal success, both in this state and in different parts of the union.

It seems that the editor admits the policy of adopting the system of separate enclosures at certain periods in the history of agriculture, viz: when the country is just emerging from a *forest state*, and when it has arrived at the *highest state of improvement*. With regard to the intermediate space, he remarks: "But to arrive at this *perfect condition*, embracing enclosures of every field, it is necessary that the durable materials for fencing should be sufficiently cheap—that the land marks on which to build walls, or plant live hedges, should not be changed in every generation, or oftener—and above all, that the profits derived from grazing should be sufficient to compensate amply the additional expense of enclosures. None of these circumstances exist in our naked and poor country—and the whole rent of the country, taking rich and poor land together, would not pay for keeping it enclosed in 20 *acre lots*, as may be good policy in England, and even in some parts of the northern states."—(*Farm. Reg. Vol. III. p.* 50,) From feelings of courtesy towards us, and an evident disposition to leave the discussion of the subject to others, the editor has declined going into the *general question*. But he has nevertheless thought proper to settle the whole subject in a manner more remarkable for its brevity than its accuracy. We never maintained that *rock walls, live hedges*, or 20 *acre lots*, were necessary to the proposed scheme of agricultural reform. They were merely referred to in order to illustrate our views of the subject. In the cases particularly cited as being worthy of imitation, the common perishable worm fence of the country was used. And the size of the separate enclosures was regulated according to the convenience of the individual. The editor certainly could not suppose that we recommended the construction of 20 acre lots upon an estate consisting of 500 acres of arable land? The profits of such an arrangement could under no possible circumstances, justify its adoption. Upon an estate of this size these small lots would not only be unnecessary for stock management, but would interfere very seriously with the other operations of the farm. The number of lots should be regulated principally by the rotation of crops. For instance, the four, five, or six-field systemought to have at least the same number of separate enclosures. With this arrangement, these separate fields can be gleaned or grazed, according to circumstances. As to the perishable nature of the fencing material, we could very properly remark, "sufficient for the day is the evil thereof." Why indeed should we trouble ourselves about the substitute until the period arrives when we shall be compelled to adopt it? Dead fences are certainly the best as long as they are the cheapest—and moreover, being easily moved from one place to another, are peculiarly suited to our law of descents, which is constantly changing our land marks. Perhaps the editor will object to the cases referred to, as coming under the specified exceptions. If so, he must exempt one-half of the estates in Virginia. But Mr. Craven expressly states that when he took possession of the premises in question, the soil was reduced to a state of great exhaustion by the very system which has impoverished other portions of the state. Yet this gentleman has found the ways and means of adopting, with success, the system of separate enclosures upon the whole of this arable surface. We are but little acquainted with the general condition of the arable lands in other parts of the state, but with regard to those of Prince George, we have the following description, (we presume from the pen of the editor:) "Much land is planted in corn which does not produce more than one barrel of corn per acre; and about one-half of the arable land of the county falls short of two and a half barrels, which has been stated as the least product that will defray the expense of cultivation. *One-half of our land is not only cultivated without profit, but with certain and increasing loss*—and to this purpose our labor is devoted ninety days, the whole crop being supposed to require six months. Every consideration of profit demands that this portion of our soil should not be cultivated in its present condition." (*Farm. Reg. Vol. I. p.* 231.) Yet the editor makes us embrace in our remarks, the whole of this unprofitable surface: and what is still worse, we are made to build rock walls, rear live hedges, and construct 20 acre lots, upon lands which do not pay the simple labor of cultivation. Our remarks were never intended to apply to soils so hopelessly impoverished, and we shall dismiss them with the remark, that the sooner they are abandoned the better. But to the owners of the small, but really valuable portion of the county, we point them to the neighboring forest, and entreat them to make separate enclosures, and rear the artificial grasses. This system has led to wealth under circumstances not at all more favorable, and will do it again with the use of capital and enterprise. In the words of the above report, "a farm which would yield a regular annual profit of $600 after paying all the expense of cultivation, would be thought cheap at $10,000. But certainly it would be equally profitable to lay out 10,000 dollars on the improvement of land already in possession, if from that improvement, an additional clear profit of 600 dollars could be derived." Now we venture to affirm, that half of this sum applied in the manner recommended, would yield an additional income from stock alone, independent of their immense value as agents in fertilizing the soil.

We assert in the very face of the experiments with which we have been favored by "Fence less," that the proprietors of landed estates in Virginia, cannot afford to raise the stock necessary for domestic uses, in pens and small enclosures. We admit that where a few pigs only are sufficient for an entire family, as in New England, they may be cheaply raised upon the otherwise useless offal of the farm. But when the numerous mouths of a Virginia estate are to be filled, it is altogether a different affair. A different system of stock management must be adopted, or the proprietor will be ruined in his attempts to imitate practices unsuited to the condition of the country. The New England farmer derives no small portion of his profits from his stock, and he is therefore amply remunerated for the additional labor and expense he bestows upon the subject. On the other hand, we are tillage farmers principally in Virginia, and the most we ought to expect is a simple supply for domestic uses. Even with this difference in the circumstances of the two cases, this system we recommend as best for Virginia, is adopted, on account of its greater cheapness, by some of the very best northern farmers. This system must combine judicious grazing, in which stock become, in part, their own caterers. What becomes of the hundreds of bushels of small grain unavoidably left upon the harvest fields? Of the aftermath of the meadows? Of grazing lots at those periods when they cannot be mowed, and when they receive little or no injury from the hoof? Yet these are some few of the advantages to be wilfully relinquished for a system of management yet untried, and every way more expensive and laborious than the one proposed. "Fence less" tells us that he fed his ox in an old barn from the 1st of December until the March following—but does not inform us what becomes of him after this period. We conclude, however, in the absence of better proof, that he was introduced to the salting tub. The experiment of the cows is remarkable for the same omission—and we are left equally in the dark whether he made beef of them, or turned them to grass. The inference is fair, however, that he adopted the latter alternative. The third experiment of the ten shoats is changed to the summer months, for reasons sufficiently explained by the *clover hay* and the *morceau* of corn. These experiments would be very *stubborn* indeed, but for the omissions of a few very important months. "*Hiatus maxime deflendus.*" Now we ourselves once made an experiment of this sort upon several dozen shoats, commenced very honestly the last of October, and continued until we were threatened with famine. They were then turned out with the solemn injunction to root or die. We should have been obliged to "Fence less" if he had extended his experiments to his entire stock for one whole year, and had then presented us with the results—the state of the corn crib, &c. These he must admit are indispensable considerations in settling a matter of so much importance to the interests of agriculture. It is indeed to be lamented, that those who oppose the policy of the law of enclosures, have failed to point out exactly the method of management they propose to substitute in its stead. The injustice of the law is constantly deprecated: yet the planter or farmer is left at a loss to know what is to become of his stock. It is true we are favored with an occasional experiment or so—but even when fairly carried out for the whole year, they are unsatisfactory and inconclusive, because confined to too small a portion of the stock necessary for domestic uses.

As we have been particularly referred to a writer who signs himself "*Suum Cuique*" as proper authority on this subject, we will take the liberty of adverting, for a moment, to the plan he proposes to substitute in the place of the system imposed upon us by the law of enclosures.

"Each farmer having to maintain his own cattle would keep a smaller number, and confine them generally to a permanent pasture, well enclosed: and being necessarily reduced to *one-fourth of their present numbers*, and treated as well as the change of the system would permit, the live-stock would yield more products of every kind (except hides perhaps) than at present. The lands kept for tillage, *thrice as extensive as the enclosed pastures*, if too poor to be grazed might be safely left without a fence, until their improvement in after time may make enclosures necessary for the owners' interest." (Farm. Reg. Vol. I. p. 398.) Admitting that the fourth part of a farmer's stock would yield more products than the whole, under existing circumstances, (which by the by we don't believe) yet he is still left without the assurance that these diminished numbers will afford a competent supply. It is unquestionably the true policy of the people of Virginia to relieve themselves from the heavy tax they are compelled to pay annually for western meat. No plan of reform is worthy of a moment's consideration which does not profess to meet the whole difficulty. When the defect is radical it must be encountered with a remedy which goes to the very root of the disease. The proposed plan of reform, if not avowedly partial, leaves the subject in doubt and uncertainty, even if we are sure of the anticipated results. But so far from gaining any thing by the plan of "*Suum Cuique*," we are firmly persuaded we should be losers by it. Let us see. One-third of the arable land of the country is enclosed for standing pasture—the remainder is appropriated to tillage. It would be difficult to state the exact amount of stock necessary for the use of any particular estate. But we can venture to affirm, that the live-stock necessary for the consumption of Virginia estates generally, would leave the portion devoted to standing pasture in a situation as destitute of vegetation, as the ordinary unenclosed commons of the country. If this be the case then, the farmer is left in a worse situation than before. He is deprived of one-third of his arable lands, for an advantage which the naked commons afford him, even if they are as destitute of vegetation as the summit of the Alps. His stock must be grain fed in both cases; but the proposed scheme deprives him of one-third of his means for feeding them. The farmers and planters of Virginia are sensible of this difficulty, and for this reason are but little disposed to favor the repeal of the law of enclosures. It is true they are saved the expense of fencing in two-thirds of their arable lands; but, on the other hand, they know that they must lose the profits of one-third of their estates, upon the standing pasture system. The choice of the two evils is too obvious to admit of a moment's deliberation. We will add, moreover, that so far from increasing the products of live-stock by diminishing their number, as "*Suum Cuique*" affirms, the proposed scheme, by diminishing the means of subsistence, would necessarily reduce their numbers, without improving their value. For instance, if an estate of 300 acres arable land will support 30 hogs in a certain condition, one of 200 acres will keep only 20 in the same condition. Here then we have a scheme if carried into practice, would deprive the people of Virginia of three-fourths of their stock and one-third of their arable lands, and leave them in a situation infinitely worse than before.

With regard to the effect of the law of enclosures upon the small farmers, the editor remarks, "The law is perpetually operating to starve out, deprive of their little freeholds, and to banish from Virginia, the valuable class of small farmers, whom it is averred, the system protects." That the law of enclosures imposes a great deal of unprofitable labor, under existing circumstances, we never denied, and it doubtless accelerates the tide of emigration, constantly carrying off so large a portion of this class of our citizens. But the true moving source of the evil, if an evil it be. exists in the peculiar circumstances of the country, and the same result would have happened though protracted perhaps to a later period, independent of any influence from the operation of the law of enclosures. This cause is to be found in the circumstance, that wherever land is cheap and labor dear, individual interest dictates the adoption of that hard and destructive system of cultivation which so very generally prevails in all new countries, particularly where the products of agriculture have borne enormous premiums. The first victims of this self-imposed, but land destroying system, are the proprietors of ordinary lands. As you advance in the grade of fertility, the tide of emigration is slower—but the cause is still operating until you arrive at soils whose recuperative energies defy the most pernicious agricultural practices. Another assisting cause is to be found in the law of descents. This law is constantly reducing estates to a size which forbids a fair remuneration for agricultural employment. This effect is most sensibly felt in tracts of inferior fertility; because soils of this description offer no inducement for re-uniting these scattered and valueless fragments. For this reason, the great proportion of small farmers are found upon worn and exhausted lands. But wherever lands present a fair prospect for remunerating labor, we find estates assuming a size in spite of these adverse circumstances, which fully justify schemes of profitable husbandry. We refer, for instance, to our alluvion lands and to those belts of extraordinary fertile highland to be found in every part of the state. These remarks are not made, to justify the policy of the law of enclosures, but to show that our agricultural evils are mainly attributable to far other causes than the one specified. The law itself is a mere accessary, the necessary result of our peculiar circumstances—and its repeal would have the effect of hastening the very catastrophe which is so much deprecated by its adversaries. Under the influence of these considerations, we cannot consent to the adoption of any legal measure which will add to the evils of a system which is already dragging its disciples to a point, when it must be finally abandoned.

It is farther objected to the law, that it has a tendency to "amalgamate the small freeholds, and bring them under one fence and one owner."

Whatever his correspondent may think on the subject, the editor will certainly agree with me, that the circumstance complained of, is any thing but an evil. As far as the small farmer is concerned, he is a gainer by it; for he is exchanging unprofitable for profitable labor. As far as agriculture is concerned, the larger the tract in possession of a single individual in a poor and exhausted country, the better. The whole will then have a fairer chance of feeling the beneficial effects of a milder husbandry. Thus have the evils of our agricultural system a tendency to correct themselves, without the intervention of legal assistance, and to bring about those very advantages, which in England have been produced by a singular but very fortunate combination of circumstances.

FENCEMORE.

[Though the foregoing argument is addressed principally to the editor, we shall not trouble our readers with a reply—which indeed, if attempted, would necessarily be drawn from the same materials that have been already used in various parts of this journal. We shall be content with remarking on a single passage of the last paragraph, which shows, on the part of the writer, a misapprehension of our views.

Our correspondent is greatly mistaken in supposing that we agree with him in considering an amalgamation of small farms, forced in the manner stated, as "any thing but an evil." Both large and small farms have peculiar and important advantages, as well as disadvantages, and it is essential to the improvement and profit of agriculture, and to the interest of the people, that there should be farms of both classes—and of every size, except such as are either too large or too small to yield, under suitable and proper management, fair profits. But the great evil is, the frequent change of landmarks—the converting large farms to small, and small to large—the very thing which our correspondent welcomes as a boon bestowed by the operation of the law of enclosures. "Fencemore" had just stated, (and very correctly,) that the tide of emigration from Virginia is swelled by the law of descents, which "is constantly reducing estates to a size which *forbids a fair remuneration for agricultural employment.*" Then comes the alleged benefit of the law of enclosures, which by making it impossible for the owners to fence and till their little freeholds, compels them to be sold, to be united in some newly formed and newly arranged large farm. Both the changes are necessarily attended with prodigious losses, to the land owners and to the public—and the losses are such as can never be repaired. The small shares of a farm, divided among the heirs of the former owner, are necessarily in most cases of much less value than when united. The purchaser who unites various such shares of several ancient properties, certainly places them in a better situation for profitable culture—but even this object cannot be reached except by additional and great waste of labor and of capital, which would have been unnecessary but for the change of owners and of landmarks. The life of one farmer is spent in fixing an estate in the best form for one property—as a single well managed farm. He dies, and all the loss is sustained by his heirs and the country at large, which necessarily attends the cutting up of this large and well arranged farm into four or five pieces, neither of which is worth holding separately. One child is impoverished by having all the houses, and of course very little land—all the others are houseless. One or more have nothing but forest—others not a tree for fencing. They may possibly spend another generation in struggling under these evils, and in undoing all their father's arrangements. But soon or late, (with that aid of the law of enclosures which "Fencemore" considers in this respect so beneficial,) these reduced properties are, one after another, drawn into the adjacent large farms, and again all the arrangements of the last owners are useless, and are lost to them in the price, to the purchaser, and to the commonwealth. To continually *do and then undo*, is the operation of our governmental land policy—and whatever may be its benefits, they are purchased at an enormous sacrafice of the profits and capital of agriculture.

The agricultural prosperity of a country would be greatly promoted, if the dividing landmarks of farms could never be changed, except by sale or gift, both parties *being alive* at the time, and consenting to the transaction—when it may be supposed that the change would be advantageous to the individuals concerned, and consequently, to the public interest. But changes forced by the operation of law, whether they be in dividing a single farm, or consolidating the parts of the separated shares of several, must always be injurious to both private and public interests. We speak not of the political, moral, or social benefits of the divisions of farms, as caused by the law of descents. Let others make the most of these benefits, concerning which it is not our business to treat. But as they affect the interest and improvement of agriculture—as obstructions to reaping the full amount of product which the entire surface of the country would yield to labor judiciously directed—we regard the continual division of farms under that law, together with the consequent consolidations of various disjointed and unsuitable fragments to form large farms, caused by sales forced by the law of enclosures, as a combination of inflictions on agriculture which yield only in magnitude to the present exhausting drain, or rather flood, of emigration to the west.]

From the *Code of Agriculture* of the 5th edition, 1832.

ON THE RUST* OR MILDEW.

It is proposed to discuss this important subject under the following general heads, 1. The nature and appearance of the rust or mildew; 2. Its causes; and, 3. An account of such remedies as have been suggested, either to diminish, or to extirpate the disease.

1. *The nature and appearance of the rust.*—This disease usually appears in wheat, in the month of June, after the plants have grown to their full length, and before their seeds have ripened. Its first appearance is on the leaves and stems of the plants, in the shape of spots of a dirty white color. They soon become yellow or brown, and afterwards black; and they seem to rise, thicken, and grow up in a roundish shape, on the stalk and leaves of the plant. From the time that these spots are found, the vigor and luxuriant growth of the plants evidently decline, and they make no further progress towards maturity. The stalk becomes so brittle, that it breaks under the flail, and emits dust of a disagreeable flavor, affecting the breathing of the workmen.†

As mildew, whenever it falls on grain crops, arrests the farther growth of the plants, and exhausts the juices that should have matured the grain, it is advisable, to reap the crop whenever the disease appears, and before it extracts the natural juices of the plants. The grain produced by an infected plant is small, poor, and of a pale color, but as it contains none of the rust, it is not unwholesome food.

2. *Causes of rust.*—Several of the accidents enumerated in a preceding section, (No. I. p. 53,*) may contribute to the production of rust; but the principle causes are, having the land in too rich a state for corn crops; a too frequent repetition of so exhausting a crop as wheat, more especially on weak soils, which renders the application of much manure necessary; or when the crop meets with a check in its progress to maturity, and in that weakened state, is exposed to heavy rains, or variable weather.

It has been well observed, that when crops, *intended to ripen their seed*, are objects of culture, there is only wanted a degree of vigor and luxuriance in the plants, sufficient for that purpose; and if the fertility of the soil be raised to a much higher pitch than is necessary, or consistent with that object, injurious, rather than beneficial consequences may be the result.† Land may be too rich for corn crops, and it is better to keep it in a *well-balanced condition*, or in a medium state of productiveness, than in too fertile a state.‡ A superabundant quantity of sap and juices, in vegetables growing on highly cultivated lands, it is evident, must necessarily render them more susceptible of the effects of sudden and extreme changes, and consequently more liable to disease. Besides, as mushrooms are produced on beds of dung, great quantities of manure must promote the growth of fungi, or parasitical plants, on the crops of wheat, if they are once infected. The wheat produced on the site of a dunghill, is always rusted, even in the most favorable seasons; and if the whole field is a species of dunghill, how can it escape?§ The whole fungus tribe are seldom seen to grow, but from superfluous vegetable matter, as rotten wood, thatch, dedecayed hay, or some light rich substance, aided by a certain degree of heat and moisture; and there is no substance more analogous to such a

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* Rust is the proper name, being a literal translation of the French "*La Rouille*," and the Latin "*Rubigo*." The disease has at first a brownish, *rusty* appearance, which afterwards becomes black.

† Sir Joseph Bank's Account of the Cause of the Mildew in Corn. Communications to the Board of Agriculture, vol. iv. p. 399. See also the Translation of M. Desmazieres's Paper on the Diseases of Wheat, annexed to "Hints on the Agricultural State of the Netherlands," p. 22. The celebrated Tessier was the first naturalist, who directed his particular attention to this subject, in his work entitled, "Traité des Maladies des Grains."

* Pliny (Lib. 18. c. 28,) attributes the rust to frost, and in this way it may be accounted for. If frosty nights are succeeded by hot gleams, disease is inevitable, unless the frost could be shaken off, before the influence of the sun is felt. It is a singular fact, that plants of wheat under trees escape rust, though the neighboring crop is infested with it.

† Hence the great advantage of having previously a green crop, to absorb the superabundant and injurious richness of the dung.

‡ Communication from Dr. Conventry. It is stated in a letter from Mr. Wm. Scott of Horncastle, (Farmer's Journal, Nov. 20. 1815,) "That wet falling on soils *full of manure*, causeth too luxuriant a growth of corn, from whence springs mildew." This doctrine is sanctioned by the authority of Parmentier, who ascribes the rust, "à l'abondance d'un suc nourricier, resultant d'une vegetation trop vigoureux, plutôt qu'aux brouillards, qui n'y ont aucun part directe. Traité sur la Culture de Grains."—Vol. i. p. 242.

§ Communication from John Middleton, Esq.

production, the offspring of corruption, than dung. This may be regarded at least, as a proximate, or predisposing cause. If the seeds of the *fungi* float in the atmosphere, they more easily find a *nidus*, on too succulent and lusty growing plants, the substance of which is in a tender state, and the pores more dilated, than in the hard straw produced by a compact soil.*

A too frequent repetition of crops of wheat, more especially when accompanied by great quantities of manure, to force a crop, or raised on soils unsuitable to the growth of that crop, will often have the same effect. The rust was but little known in the western, or the northern parts of England, or the southern counties of Scotland, until of late years, when every exertion has been made, to increase the quantity of that grain. Even clay lands, so congenial to wheat, have been injured by such severe cropping; but on weaker soils, as sandy and calcareous loams, the plant has suffered, in respect both of quantity and quality.

It is well known, that loose and open soils such as turnip lands in general, are the most apt to be rusted; and the reason is, that the roots in them, are the largest and longest, and generally, in search of moisture, run the deepest into the soil. The stems are thence luxuriant, large and porous. The roots being long and straggling, often get into a noxious stratum below, or into one not productive of nourishment. When that is the case, the plant, formerly luxuriant, meets with a sudden check, (for it is only from the extreme points of the roots, that the plant derives its nourishment by absorption;) and this sudden check *predisposes it to disease*. If then the month of July is accompanied by warmth and moisture, or even the beginning of August, the plants of wheat, in their weakened state, will be attacked by those *fungi*, to the propagation of which, that description of weather is so favorable, more especially in places where a free circulation of air is wanting.

In proof of the doctrines, it may be observed, that in loose and open soils, *treading the land thoroughly*, after it is sown, is an effectual preventive of the mildew; the roots being thus hindered from becoming loose and straggling, or getting into poor or noxious strata, whence no nourishment can be derived.

3. *Remedies against rust.*—Among the remedies likely to diminish the effects of this fatal malady, the following have been particularly recommended: 1. Cultivating hardy sorts of wheat; 2. Early sowing; 3. Raising early varieties; 4. Thick sowing; 5. Changes of seed; 6. Consolidating the soil after sowing; 7. Using saline manures; 8. Improving the course of crops; 9. Extirpating all plants that are receptacles of rust; and, 10. Protecting the ears and roots of wheat, by rye, tares, and other crops.

1. In a plant of which there are such a number of varieties, as in the case of wheat, it is evident, that there may be some, distinguished by peculiar properties, and consequently less liable to disease.* It is said that the red wheats† are hardier than the white, and that the thin, or smooth-chaffed, are less apt to be rusted, than the thick-chaffed sorts. A variety of red wheat, called *creeping-wheat*, is much cultivated, on that account, in Yorkshire, and on the borders of England and Scotland;‡ and in Worcestershire, the farmers are partial, on account of the hardiness, to a species of cone wheat, originally from Courland, which is not so apt to be injured in bad weather.

2. Sowing wheat early, is a preventive that has been long recommended, with a view of having the ear filled, before the season is likely to be injurious.§ In confirmation of that doctrine, it is remarked, that in the county of Somerset, the crops were formerly reaped much earlier than at present, the wheat harvest being generally over in the month of July,) and that *the rust or mildew was then unknown*.¶ A farmer in Essex, who was accustomed to sow his wheat after beans, had his crops constantly rusted, but was no longer troubled with that disease, *when he sowed early* either on clover leys or after a fallow. In Bedfordshire, it is remarked that wheat which *mays*, or turns yellow in that month, (which is in general, the consequence of being sown early,) never mildews.|| It is no advantage, however, to have the wheat too forward in spring, and the sowing should not, on that account, be commenced earlier than the beginning of September, even on fallows. A distinction ought likewise to be made, between cold, wet and heavy soils, and the light, dry and porous ones. It is well known that the latter, though even a month posterior, will be as soon, if not earlier, ready for the sickle.

3. As sowing early is attended with some disadvantages, (the nourishment in the soil being exhausted *by the stalk*, before the formation *of the seed* commences, the plants becoming winter proud, as it is called, or too forward for the season, and the crop being more apt to be injured by spring

* It is remarked by Mr. Holdich, that the disease is generally in proportion to the broadness of the leaf; that it first takes place upon the upper leaf or sheath, out of which the ear issues. When this is narrow, small, and early withered, there is little danger from rust. Those broad leaves ought, if possible, to be got rid of, which perhaps may be effected, when the crops are drilled.

* Spring wheat is said to be not so liable to be rusted as other wheat, in Dorsetshire, (Report p. 213,) and in South Wales, (Report, vol. i. p. 399,) but equally so in Derbyshire, (Report, vol. ii. p. 119,) and in other districts.

† Near Exeter, they have lately got a red foreign wheat, which, it is said, is not liable to be rusted.

‡ General Report of Scotland, vol. i. p. 447.

§ Worlidge's Systema Agriculturæ, vol. i. folio, p. 210 Printed an. 1681. On the advantage of early sowing, see Oxfordshire Report p. 151, 152; Northamptonshire Report, p. 86; Berks Report, p. 200; Dorset Report, p. 209, 210. &c. By early sowing, the autumnal rains may be avoided, which put the plant in a succulent or plethoric state, and consequently render it liable to infection. In dry weather, the straw is of a firmer texture, and affords no admission to the seeds of the fungus, that may be slightly attached to them, *if the disease be thus propagated*. Bedfordshire Report, p. 333 That, however, is much doubted.

¶ Communications to the Board of Agriculture, vol. v. p. 202.

|| Bedfordshire Report, p. 377.

frost,) it would be very beneficial, to procure a sort of wheat, either from some foreign country, or raised by selection at home, that would ripen early, without being sown much sooner than at present. Nature produces numerous *varieties of the same species*, belonging to the same genus; and it is incumbent on the attentive and industrious farmer, to avail himself of the circumstance, from which so much advantage might be derived.*

4. It is a maxim with many farmers, "*That thick crops are sometimes mildewed, but that thin ones generally are so, in a greater or less degree.*"† This arises from the following circumstances: when the seed is sown thick, the roots, instead of becoming long and straggling, are short and numerous. They are retained in the soil, more especially when the crop is drilled, that has been prepared for their reception, instead of wandering into strata, either poor or noxious. From the number of these roots and stems, the richness, which would be injurious to a few plants, only does justice to a number; for the same quantity of dung that might give twenty stems a disposition to disease, would only yield a proper quantity o food, when it had fifty to nourish. There is *no tillering*, which necessarily produces weaker plants, liable to disease. By thick sowing in drills all the advantages of treading, *in so far as respects rust or mildew*, will be obtained, for the roots of the plants will be short and numerous, and matted together, instead of being long and straggling.

It is proper here to allude to a communication of much moment, from which it appears, that in former times, when four bushels of wheat per acre were sown, the mildew was of much rarer occurrence, than since the practice of thin sowing has been adopted;‡ and there can hardly be a doubt, if the land is in good order; if the crop is sown early; if four bushels of seed are sown under the drilling system; and if the wheat is preceded by a green crop, so as to exhaust the pernicious qualities of the dung, that the crop of wheat will not be rusted.

It is proper to add on this subject, that it is much more prudent, to rely on the abundance of seed, than on the effects of tillering. When the latter is depended upon, during the time that the process is going on, much time must be lost, in the growth of the plant to maturity. The consequence is, both a later, and a more unequal ripening.

5. As wheat is not an indigenous, but an exotic plant, it might be less liable to disease, if the seed were occasionally changed by importations from foreign countries. The best Flemish farmers, regularly change their seed every two years, and assert, "that by this renewal of seed, all the maladies of grain are prevented." Some purchase their seed from d'Armentiere, near Lisle, in French Flanders, while others recommend wheat grown in the *Polders*, (a species of salt marsh) in Holland, by means of which, they maintain, that the rust is avoided.*

It is likewise stated, on the respectable authority of an eminent naturalist, (T. A. Knight, Esq.) that by crossing different varieties of wheat, a new sort may be produced, which will completely escape being rusted, though the crops in the neighbourhood, and in almost every district in the kingdom, may suffer from it in the same year.† These circumstances tend to prove, that the rust does not depend solely on atmospheric influence, otherwise it could not be prevented by changes of seed, or by the crossing of different varieties.

6. The advantages of treading light soils, have been already explained.‡ It may be proper, however, to state the following facts, in support of the doctrine that treading will prevent the rust. In 1804, a farmer sowed 25 acres of a pea-stubble with wheat. After the usual operations of ploughing, scarifying, manuring, sowing and harrowing, it was trodden with sheep, to the consistency of a highway. The produce was 32 bushels per acre. For the sake of comparison, a part of the field was left in a light state, untrodden, and it was rusted. The same farmer had 14 acres of wheat planted with potatoes. The potato tops were pulled up, and the wheat sown on the surface. The potatoes were then forked and dug up, and the wheat trodden by the women and children in picking up the potatoes. The crop was free from rust, and of excellent quality. It has often been remarked, that when a field has been destroyed with rust, the head lands, which the horses have trodden much in turning, have generally escaped.§

7. The advantage of using saline manures, as a remedy against the rust, (a late discovery,) is an important circumstance. Its success seems to be proved, by the practice of several farmers in Cornwall, who have been in the habit of sowing, about a fortnight before the turnips, the refuse salt of the pilchard fishery, as a manure for that crop, in the proportion of $31\frac{1}{2}$ bushels of salt, (56 lbs.

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* In Cornwall, they frequently sow a mixture of red and white, (provincially, *dredge-corn*,) and the crops are more abundant when sown mixed, than when sown separately. When separate, the produce may not exceed 18 bushels per acre; whereas when the two sorts are mixed, the produce will amount to 24 bushels.

† It may be asked, what is thick and what is thin sowing? That must evidently depend upon the fertility of the soil, and the period of the year when the seed is sown.

‡ See Mr. Purt's Letter, annexed to Mr. Blaikie's, printed in the Farmer's Journal, dated Holkham, Oct. 12th, 1820.

* That eminent farmer, Robert Barclay, Esq. of Ury, in Scotland, brought his wheat seed from England every two years, and sowed only what was produced from English wheat the preceding year.

† In Italy, they recommend thin sowing, alleging, that as the infection may go from ear to ear, it is less apt to spread, when the ears are not in contact. But this seems to be erroneous doctrine.

‡ A farmer has gone so far as to assert, that if the land, be the soil what it may, were trodden by a troop of horse, or a drove of cattle, after being sown with wheat, there would be scarcely such a thing as the rust known. But it is obvious, that treading in this way would do no good to clay land, but on the contrary, might much injure the crop. Light soils are more liable to produce mildewed wheat, because the plants grow too fast in spring, and have long and straggling roots.

§ It would not be difficult to invent a machine that would compress the land, if that operation would effectually prevent the rust.

each,) per statute acre. They all agree, that they have never had any rust on their wheat, where this practice was adopted. though before, they were greatly affected by it.* The expense would be inconsiderable, since the tax on salt has been taken off. The uses of salt in animal life, prove how beneficial it would be to vegetables. In animals, it is found to promote perspiration, *and to prevent corruption in the juices*;† and consequently it is the most likely means of checking the propagation of fungi, and preventing that rottenness and corruption, to which wheat is liable when it becomes rusted. The doctrine is strongly supported by the following facts: 1. Rust is rarely experienced in the immediate vicinity of the sea, unless when the ground is greatly over manured;‡ 2. When sea-ooze is employed as a manure, impregnated as it is with saline particles, the crop generally escapes that disease; and, 3. Rust is little known in Flanders, where Dutch ashes, *full of salts*, are in use.

8. As land in too rich a state, is apt to produce rust, it is found to be an effectual remedy, if, previous to a crop of wheat, the dung be applied to a smothering crop, as tares, hemp, or cole-seed, on strong lands, or potatoes on light soils. Indeed wheat after cole-seed, is scarcely ever known to be rusted.§ The general culture of that article, and the use of Dutch ashes, impregnated with saline matter as a manure, tend greatly to that exemption from rust, by which wheat in Flanders is distinguished. Potatoes, *when the crop is large*, have sometimes had the same effect. A field was sown with wheat, partly after summer fallow, partly after clover ley, and partly after potatoes; the two former portions were found rusted, whereas the part where the potatoes had been sown, produced grain, plump and equal, and only deficient about one-tenth of the usual quantity. Wheat, after a thin crop of potatoes, is, however, often rusted in this country; but in Flanders, where the wheat is never materially injured by rust, potatoes are considered, in its highest cultivated district, (the Pays de Waes,) as the best preparation for that crop. If too much dung occasion the propagation of fungi, which there is reason to believe is the case, smothering crops, by exhausting and diminishing the strength of dung, may take away that tendency.

9. Mr. Clack, the respectable Rector of Milton in Devonshire, whose communication on the subject of rust is one of the most valuable hitherto published, strongly recommends the cutting down all those plants which retain the fungi, in their various stages, even during the severest frosts of winter, and which, on the return of a little mild or humid weather in spring, are thought to contribute to affect, with an astonishing rapidity, the earliest leaves and shoots of those vegetables, which are congenial to their propagation. These fungi flourish with such an extraordinary luxuriance, that in the course of a week or two, they seem to arrive at maturity, and disseminate their baneful effects throughout thousands of acres, on which depend the profit of the husbandman, and a large proportion of the sustenance of the community.*

Among the common plants, the colts-foot, the corn marigold, and the common couch, are said to be so favorable to the growth of these fungi, that no field can be free from rust, in which they are to be met with. Every exertion ought therefore to be made, for their total extirpation.

Some evergreens seem to retain these fungi, during the coldest seasons, as the box, when planted in low and damp situations, and above all, the bramble-bush, which ought to be cut down as close as possible, in hedges and coppices, at least once or twice a year. The abele, or silver poplar, and willows, ought likewise to be kept under, as some of the chief causes of rust in their neighborhood.

Several trees also, retain old fungi during winter, on their barks, as the black alder, the common willow, the hazel, the birch, and sometimes oak coppice. The barberry retains this source of mischief, in any fissure or cleft in the bark occasioned by injury, exhibiting numerous black postules. These should be cut out. The contradictory accounts regarding the effects of the barberry-bush, in occasioning rust, may thus be explained. Where the skin is smooth and entire, the barberry does little or no mischief; where there are fissures in the bark, it proves the source of destruction. Hence also, when the barberry-bush is small, it does not occasion mildew.†

The practice of cutting the hedges, when a crop of wheat is sown, ought to be universally adopted, as a likely means of lessening the quantity of fungi, that would otherwise injure the crop. By this attention to the improvement of his hedges, and the extirpation of weeds, Mr. Clack's glebe, on which, from time immemorial, the wheat was subject to rust, has been rendered nearly as free from that disorder as the open fields of his neighbors.‡

10. A curious and most important circumstance, connected with the rust in wheat, remains to be stated. In the northern counties in England,

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* Particularly Mr. Henry Sickler, whose practice was communicated in a letter to a respectable Member of Parliament, Davies Gilbert, Esq.—See also the evidence of Dr. Paris, before the Salt Committee of 1818, p. 30.

† Code of Health, 4th edition, p. 178.

‡ Essex Report, vol. I. p. 301; Dorset Report, p. 209.

§ General Report of Scotland, vol. ii p. 530; Dumfriesshire Report, p. 31, and Appendix, No. VI. p. 581.

* Devon Report, p. 436.

† Bedfordshire Report, p. 379.—The facts brought forward in the County Reports, Cheshire, p. 134, Cambridge, p. 131, seem to prove the fatal effects of the barberry, in occasioning rust.

‡ In a recent communication, dated 16th June 1817, Mr. Clack states, that in the year 1811, he sowed a field of wheat after clover, which was notorious for rust; but the crop produced next year was the best in the neighborhood, which he attributes to his continued attention, in cutting out such shrubs, as were congenial to the growth of rust, in the adjoining coppice and hedges; and to the consolidation of the soil, by filling it with sheep after sowing, for which purpose, a number should be collected, and slowly driven in a compact body, so as to give a simultaneous effect to the land.

where it is the practice to sow what they call *meslin*, (blend corn.) or a mixture of rye and wheat, it has been there remarked, that wheat thus raised *is rarely infected by the rust.** It is singular, that the same circumstance has been observed in Italy. In an account drawn up by the late Professor Symonds, of Cambridge, on the climate of that country, it is recorded as a known, but extraordinary fact, "that wheat, mixed with rye or tares, (for it is a frequent practice there, to sow tares with wheat,) *escapes unhurt*."† It would appear, from tares being so useful, that the seed of the fungus must be taken up *by the root*, and that if the root be protected it is sufficient. This seems to be countenanced by other circumstances, as, that by treading the ground, and thick sowing crops of wheat, the crop is less liable to be infected by this disease; the access of the seeds of the fungi, to the root, being rendered more difficult. The effect of tares as a preventive, may easily be tried. The double crops sown in Flanders, where the rust is hardly known, is another circumstance strongly favorable to the idea, of the advantage derivable from covering the roots of wheat from infection. Mr. Knight is decidedly of opinion, that the disease is taken up *by the root*, (every experiment to communicate it from infected straw, to others, proving abortive;) and indeed, if it were introduced at the ear of the plant, how could it descend, and infect solely the stem? which is the case, unless when the disease is inveterate. Others attribute rust to the influence of the sun upon the roots. Hence the advantages of having a thick, rather than a thin crop; and hence, it is said, the beneficial effects of mixing rye with wheat, the rough bending head of the rye, protecting the earth from the power of the sun. It is also a singular fact, that plants of wheat under trees, escape rust, though the neighboring crop is infested with it. This may be owing, either to the protection from the violence of the sun, or the moisture which is retained in the soil, by the means of the shade thus procured.

By one or other of these means, and the improvements which may be effected, by the observations of ingenious naturalists, and the experience of intelligent farmers, there is every reason to hope, that the diseases of wheat may, in a great measure, be so mitigated in their effects, that they will not in future be felt as a national calamity. For that purpose, however, it is necessary, that the diligent farmer should seize every opportunity of improving his knowledge in the nature of those diseases, should note down all the circumstances connected with the subject as they occur, and should compare his observations with those of others; that whether the causes of rust are general, or local, they may, as much as possible, be obviated. He may be assured, that it is "*the perfection of good management*," to discriminate the causes to which the disorders of grain are owing, and to apply the cheapest and the most effectual remedies.

*East Riding Report, p. 127.—Mr. Tuke, the intelligent author of the North Riding Report, in a letter to the Author, dated 7th March 1818, states, that until the year 1815, rye grown amongst wheat, was generally allowed to be, in that district, a sure preventive of rust or mildew; but that year, rye itself was infected, and there was very little either wheat or meslin that escaped in Yorkshire.

† See Annals of Agriculture, vol. iii. p. 153.

From the Albany Cultivator.

PRESERVING ROOTS.

We find in Chaptal's "Chemistry applied to Agriculture," an excellent chapter on the preservation of animal and vegetable substances. We extract the following from the preliminary remarks.

"The nature of all bodies which have ceased to live or vegetate, are changed, as soon as the physical or chemical laws, by which they are governed, cease to act; the elements of which they were composed, then form new combinations, and consequently new substances.

"Whilst an animal lives, or a plant vegetates, the laws of chemical affinity are continually modified in its organs by the laws of vitality; but when the animal or plant ceases to live, it becomes entirely subject to the laws of chemical affinity, by which alone its decomposition is effected.

"The principles of the atmospheric air which is imbibed by the organs of living bodies, whether animal or vegetable, are decomposed and assimilated by them, whilst dead bodies are decomposed by its action. Heat is the most powerful stimulant of the vital functions, yet it becomes, after death, one of the most active agents in the work of destruction. Our efforts, then, for the preservation of bodies, ought to be directed to counteracting or governing those chemical or physical agents, from the action of which they suffer; and we shall see that all the methods which have been successful, are those which have been formed upon this principle.

"The chemical agents which exert the most powerful influence over the products of the earth, are air, water and heat; the action of these, however, is not equally powerful over all classes of plants; the soft and watery, and those which approach the animal matter, decompose most readily; the principles of such are less coherent, less strongly united than that of others; so that the action of disorganizing agents upon them is prompt and effectual.

"All the methods now employed for the preservation of bodies, consist in so far changing their nature, as to deprive them of the elements of destruction contained within their own organs: or in secluding the substances to be preserved from contact with the destructive agents mentioned in the preceding paragraph; or in causing them to imbibe certain other substances, the anti-putrescent qualities of which counteract all action, whether of internal or external agents.

"In all vegetable products, water exists in two different states, one part of it being found free, and the other in a state of true combination; the first portion, not being confined except by the covering of the vegetable, evaporates at the temperature of the atmosphere; the second is set free only at a temperature sufficiently high to decompose the substances containing it: the first, though foreign to the composition of the vegetable, enters into every part of it, dissolving some of its principles, serving as a vehicle for air and heat and being converted by cold into ice; by these several properties it greatly facilitates decomposition: the second portion, from which no evil of the kind arises, is found combined and solidified in the plants, and its action is thus neutralized."

Drying fruits, then, in order to preserve them, consists in depriving them of the water contained in them in a free state. This may be done by subjecting them to heat, not exceeding 95 or 113 degrees; either by exposing them to the sun, or in a stove room, or in ovens, which latter practice is resorted to, even in the warmest countries, at the commencement of the drying process. In preserving the apple, for instance, our author adds, that by depriving their surface of all moisture before putting them up; keeping them in dry places, where the temperature will be constantly between 50 and 54 degrees, and by separating the fruits that they shall not come in contact, they may sometimes be preserved 18 months. The farmer in Schoharie, who has been in the habit of bringing the Spitzenberg to our market on the 4th of July, owes his success to the observance of these rules.

On the preservation of the fruits of the earth by secluding them from the action of air, water and heat, M. Chaptal enumerates the following leading causes of decay.

"The atmospheric air, coming in contact with fruits, deprives them of their carbon, and forms carbonic acid.

"Fruits exposed to the solvent action of water suffer decomposition, by having the affinity existing between their constituent principles weakened, and at length destroyed.

"Heat dilates the particles of bodies, and thus diminishes the force of cohesion and attraction, and favors the admission of air and water.

"The combined action of these three agents produces very speedy decomposition; the effect produced by any one of them is slower, and the results different. So that in order to preserve fruits from decomposition, it is necessary to guard them from the power of these three destroyers."

Practically applied, these axioms teach, that to preserve roots in good condition, the following precautions should be observed:

1st. That their surfaces be entirely freed from moisture before they are housed or buried, and that they be deposited in a dry situation, where water will not have access to them.

2d. That they be excluded from the air, by burying them in dry earth, or slightly covering them in the cellar with earth. And

3d. That they be kept in a cool temperature; the best ranging from 34 to 45 degrees.

We frequently hear housekeepers complain, that their potatoes, turnips, and other vegetables soon deteriorate, and lose their fine flavor, after they have been a short time in their cellars. This is a natural consequence of the injudicious way in which they are too frequently kept: exposed to the atmosphere, and to a high temperature, in a cellar adjoining the kitchen, or perhaps in the kitchen itself. Again, potatoes or turnips buried in a wet condition, or the latter with parts of their tops left on, are very liable to ferment and spoil. We find it to be a necessary precaution in burying turnips, to make one or more holes in the crown of the pit, to let off the rarified air, and abate the heat which is almost invariably generated on their being buried.

In preventing the total loss of potatoes that have been affected by frost, Thomas Dallas directs, that when they are slightly touched by the frost, it is only necessary to sprinkle the roots with lime to absorb the water under the skin; that when the outer portion of their substance is frozen, the tubers may be pared and thrown for some hours into water slightly salted; and that when they are wholly frozen, they will yield, upon distillation, a spirituous liquor resembling the best rum, and in greater quantity than roots which have not been frozen.

The quotations we have made above are invaluable to the farmer and housekeeper; and if the principles which they establish are understood and practised upon, we shall have no cause to regret the length to which we have extended this article.

From the Genesee Farmer

SUGAR.

Mr. Tucker—I have seen in some late numbers of the Farmer, inquiries relative to the manufacture of sugar from beets and potatoes. The inquiry, as far as relates to beets, you have answered in your last number; and the process of manufacture where potatoes are used, has been already fully and well described in the Farmer, in vol. 2d, at page 5[illegible], in an article prepared by a practical operator, Mr. Guthrie of Sackett's Harbor, for Professor Silliman's Journal. Mr. G. made large quantities of molasses from potatoes, but with all his skill was unable to crystalize or grain it, without the introduction of some deleterious substance, lead for instance; and consequently all his was used in a liquid form, of the consistence of thick syrup, or rather honey. The potatoes were first converted into starch, and then by boiling in sulphuric acid, diluted, for some hours, into sugar. The directions in the Encyclopedia Americana for this process, are 2000 parts of starch, 8000 parts of water, and 40 parts strong sulphuric acid—the mixture to boil some thirty six hours in silver or lead; but Mr. Guthrie accomplishes the conversion by the use of steam in about six hours. The production of sugar or molasses is possible from a great variety of materials provided by nature, such as the cane, maple, beet, honey—all plants that afford starch, or substances that by chemical process can be converted into gum, as flax, linen rags, &c.; still none have yet been found, which can successfully enter into competition with the cane, where it is grown in favorable circumstances, and the production or use of sugar is unfettered with vexatious restrictions.

In your article on beet sugar, it is remarked that "chemistry has discovered a new material for sugar in wheat, the great staple of the west." That starch could be converted into sugar, has long been known; and it is only the starch in wheat, potatoes, or arrow root, that is thus convertible. Starch by some chemists, and particularly Prout, is considered as sugar partly organized; and though containing but a small quantity of carbon and hydrogen more than sugar, still this excess is sufficient to prevent its crystalization, or conversion by nature into sugar. The following table prepared from the statements of Berzelius, Raspail and Dumas, by Dr. Prout, shows in a curious and interesting light, by what mere shades of difference in their constituent atoms, substances, which to the sense appear as far apart as the zenith from the nadir, are separated. Water is composed of definite and well ascertained proportions of oxygen and hydrogen, and in the formation of sugar, starch, acetic acid, and lignin, or the pure woody fibre of trees and plants, these two materials are found united in the same proportions as in water: the only ingredient added for their completion being carbon. These substances, sugar, acetic acid, starch, and lignin, may therefore be considered as composed of carbon and water in the proportions here given.

	Carbon.	Water.
Sugar.—100 parts of sugar from starch contains	36,20	63,80
From honey	36,36	63,64
From East India moist	40,88	59,12
From beet root and maple	42,10	57,90
From English refined	42,05	58,05
From sugar candy pure	42,85	57,15
Acetic acid	47,05	52,95
Starch.—Arrow root in its ordinary state	36,04	63,06
From wheat in its ordinary state	37.50	62,50
From wheat dried 212°	42,80	57,20
Lignin.—In its ordinary state of dryness	42.70	57,30
From willow dried 212°	49,80	50,20
From box do.	50,00	50,00

Dr. Prout, in his Bridgewater Treatise, remarks "that both starch and wood can by different artificial processes be converted into sugar or vinegar. But we are unable to reverse the process, and convert vinegar into sugar, or starch into wood." The chemist Braconnet has ascertained that a pound of linen rags yields rather more than a pound of sugar. The finest crystals of sugar I have ever seen were from that of the maple. They were a quarter of an inch in length, and an eighth in breadth, flattened six sided prisms, terminated by similar sided summits. These crystals were as clear as flint glass, very hard and brittle, and not easily soluble.

W. GAYLORD.

From the Silk Culturist.

EXTRAORDINARY INCREASE.

Nurserymen, unacquainted with the cultivation of the Chinese mulberry, are probably not aware of the extent to which they may be multiplied, in a single season. In order to show the number that may be produced from a single tree, we will state the result of an experiment by Mr. Bestor, of Suffield, the present year. He laid down the branches of two trees, and thereby produced *two hundred and two* in addition to the original stocks. From the product of one tree he has already sold forty-eight, at twenty-five cents each, receiving therefore the very handsome profit of $12, and having one hundred and fifty-four remaining on hand.

From the Silk Culturist.

ANSWER TO THE SOUTH—ON THE PROFITS OF RAISING THE MULBERRY.

In our last number we promised to give our friends in the south a fair and impartial opinion respecting the aggregate amount of net profit which may be reasonably expected from an acre in mulberry; and expressed a hope that it would be sufficiently encouraging to induce the young men of Virginia to remain on the plantations of their ancestors,and give their attention to the culture of silk. We are aware of the various estimates which have been made by practical culturists, and are fully satisfied that most of them are erroneous in their results. By this we do not mean that the gentlemen who have made them have intentionally misled the public; but that they have misjudged with respect to a fair average crop. Some of these estimates are manifestly extravagantly high; while others are as manifestly below the truth. Were we to take the medium between the two extremes, we are inclined to believe it would be as near an approximation to the truth as the present state of the business will admit. Taking this then as our data we should be brought to the conclusion that from $125 to $150 net profit, may be expected from an acre of full grown trees, or covered with full grown hedges. It was also our intention to have accompanied the expression of our opinion with a comparative statement of a silk, with other crops. Farther reflection, however, on the subject has convinced us that this can be better done by detached articles on distinct crops, than in a long article embracing the whole. We have therefore decided on this course, and in another column will be found a communication from an intelligent gentleman in the state of New York, on the profit of a dairy, and an editorial article on the profit of a wool crop, from an authentic source. The profits of other crops will be given hereafter.

From the Silk Culturist.

POOR AND DRY SOILS BEST FOR MULBEBRY CULTURE. CHINESE MULBERRY.

The soil best for the production of good silk is another view of the subject of which I shall now say but little. The warmer and sweeter the soil, wherever found, the richer the foliage, and the better the silk will be of course. The hottest sand soil that trees ever grew on will produce the best silk; all fruits and vegetable productions being more or less nutritious and high favored as heat prevails in the soil in which they grow. The pravalence of moisture, as in the night and wet days, by causing an abundant flow of sap, relaxes, expands and increases the growth of plants—the heat, that prevails in the day and in droughts dries away the watery parts, sweetens and matures the growth as it is acquired—then, as moisture expands and heat condenses, moist soils may produce the greatest quantity of foliage, and hot the best in quality. Those persons, who pronounce this or that mulberry superior for the production of the finest silk, will do well to recollect that the foliage of the same tree may vary as much in quality, by growing on different soils, as the products of the same aromatic plants grown in torrid and temperate climates. That soil should be selected for the business, that will be the hottest, and at the same time, safest in regard to the health and vigor of the tree. The kind of tree should be selected best adapted to, and that will produce the greatest quantity of foliage on poor soils. This, I think, is the Chinese mulberry. It is yet to be learned how poor a soil it will flourish in; as yet I have not put it on any land too poor for it—though I have set it on light sandy loam that would not produce eight bushels of rye to the acre—where it grows quite fast enough and the soil has gradually been improving. I would recommend to any one wishing to engage in the silk business, to set out as few or as many as he can afford; but at any rate set the Chinese mulberry four by three, or four feet apart—then multiply them by layers and cuttings, not by innoculation and grafting, till they have covered as much ground as wished for—the trees to be kept within reach and continued in large plantations. I think one man, constantly employed, with a horse plough and cultivator, after the first season, may give fifty acres of free soil all the cultivation necessary. The white mulberry, but should prefer the dondolo, I would set by roads, fences, &c. for standard trees—so that all parts of a farm might be contributing to forward the business in every possible way.

Our neighbors of the states north of us, can advantageously engage in the silk business with the Chinese mulberry if soil, location, and cultivation be resorted to as here described, that will mature the tree before winter. This tree comes recommended from its native soil, as well adapted to the high northern parts of China. The length of the season has nothing to do with its wintering, if it is prepared, and if not, though it may be located many miles south of us, it will be destroyed. More care will be necessary in choosing soil, &c., as we go north; long seasons are preferable to short ones, as they will afford more time to prosecute the business. But the great value of this tree consists in its continuing so long and furnishing at all seasons of its growth, such an abundance of suitable food for the young and full grown silk worm—the leaves of the common tree becoming spotted early in the season, and unfit for use. But this disposition, in this tree, of continuing long in growth that so much enhances its value, will be liable to cause its entire destruction, if not properly managed. This tree has had the misfortune, being so highly esteemed, to find itself located in rich soils and gardens highly manured, which would protract the growth of many forest trees to the frosts of autumn, and thus, as expressed by Mr. Whitmarsh, "we kill the tree with kindness." If our friends in Mansfield can make the rearing of silkworms a source of profit, by a few weeks use of the common tree, what may we expect, when the eye of the traveller is constantly meeting on almost every farm, plantations from one to fifty acres clothed like a corn field with their rich foliage, and the same soil, cocoonery, apparatus and hands employed from the opening of the leaf in spring to the severe frosts of autumn, a term of nearly six months—and even longer by picking the leaves before severer frosts as they may be kept much longer than the leaves of the white mulberry—and this same set of hands may spend the winter in reeling and preparing the silk for market. What business promises equal profits?

After having four years experience in the cultivation of this mulberry, notwithstanding the fears expressed in many periodicals of its ability to endure our climate, I can say that I believe it will far exceed the most sanguine expectations ever entertained of it in this country. I expect to be fully compensated for the many losses I have sustained in its cultivation—for I hope and expect to see the day, and that not far distant, when the growing and manufacture of silk will become a source of greater wealth to this country than the raising and manufacture of both wool and cotton.

The frost here last week killed most of our vines and froze the leaves of the Chinese mulberry quite stiff; but did it no injury. Occasionally one or two of the small top leaves are dried up. After the last year's frosts every leaf was as dead and black as if scorched by fire. Should the tree kill to the ground annually in the fall, and sprout in the spring, I should prefer it to all others for the silk business.

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JOSEPH DAVENPORT.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

[Continued from p. 396 Vol. III.]

On the shearing of sheep.

The shearing of sheep is an object of very considerable importance in rural economy. The most proper time for this purpose must be regulated according to the temperature of the weather, in the different parts of this island. If it be hot, the month of June may be fixed, though some breeders defer it till the middle of July; under the idea, that an additional half pound of wool in every fleece may be obtained, in consequence of the increased perspiration of the sheep. An early shearing, however, is preferable, where the weather and other circumstances will admit of the operation being performed; because the new wool will not only gain time to *get a-head*, but the animal will also be secured from the attacks of the fly, to the depredations of which it becomes liable by delaying the operation.

Previously, however, to shearing, the sheep ought to be washed, in order to remove the dust and other filth which they may have contracted; this is usually performed in some neighboring stream, or even in a common pond, by men standing in the water, who, not unfrequently, become seriously indisposed in consequence. To prevent this inconvenience, as well as the abuses resulting from the careless manner in which the washers frequently do their work, it has been proposed to rail off a portion of the water, for the sheep to walk into, by a sloped mouth at one end, and to walk out by another at the other end, with a depth sufficient for them at one part to swim. Pave the whole. The breadth need not be more than six or seven feet; at opposite sides of this passage, where the depth is just sufficient for the water to flow over the sheep's back, let in two casks, either fixed or loaded, each for a man to stand in dry; the sheep being in the water between them, they swim through the deep part, and walk out at the other mouth, where there is a clean pen, or a very clean, dry pasture, or rick-yard, to receive them for a few days, until they are thoroughly dry, and fit for the shearers: the lambs being first separated from the other sheep, and confined in distinct pens. A few planks will form a bridge to the tubs, and there should be a pen at the first mouth of the water, where the sheep may be soaking a few minutes before being driven to the washers.

Where, however, much dirt has fastened itself at the points of the wool, the "Farming Society of Ireland" think it might be wise to have a large tub of water at about blood heat, in which to place the sheep, till all the wool shall be well washed and softened, and that it should be river-washed directly after. This process, the society observe, would not be troublesome as might be supposed; for the heat of the animal will keep nearly a sufficient warmth in the water, which will at all events be produced by occasionally putting in a few pails full of hot water. And it is a fact worthy of remark, that the greater the number washed, the better will the water cleanse. On this subject, Mr. Bakewell also says, "It would be desirable that the Spanish and mixed breeds of sheep were also washed in this way, because it is not possible to cleanse the fleece by the usual practice of immersion in a river, without keeping the animal a long time in the water, and thereby endangering its health. Indeed I do not think the Spanish fleeces can be cleansed by the usual mode of washing, on account of the closeness of the pile. Were the Spanish sheep in this country washed before shearing as clean as the English, the value of their wool would be better ascertained by the wool-buyer, and a more general competition of purchasers would always insure a fair price for the article.

"The extra labor required to wash sheep in tubs with warm water and lie, or soda, would I apprehend, be amply repaid, were the water of the first and second washings carried out and applied as a manure. The quantity of rich animal soap it would contain must make it one of the most fertilizing applications which could possibly be used. The greased wool would require a greater quantity of soda to cleanse it than that of the Spanish or mixed breeds, where no ointment had been applied. I annex Baron Schultz's account of the Sweedish manner of washing sheep: I think some improvements upon it will suggest themselves to the intelligent wool-grower.

"Before the shearing, the wool is almost universally washed upon the sheep. Some persons wash the sheep in the open sea, or in running water, but this is never so clean as when the sheep are first washed in a large tub, with one part clear lie, two parts lukewarm water, with a small quantity of urine; and then in another tub, with less lie in the water; after which the sheep are washed, laying them always on their back, with their heads up, in a tub with clean water; and lastly, there is poured out on the sheep, standing on the ground, a sufficient quantity of water, which is as much as possible squeezed out of the wool. The sheep are afterwards driven into an unpastured adjoining meadow, and remain there (to prevent their soiling themselves in the sheep-house) a day and night, not only till they be dry, which in good dry weather happens within the third day, but also, if bad weather does not threaten, some days longer. Some persons wash their sheep twice, which I also once tried, but the wool becomes rougher in consequence of it, and in fact of a grayer appearance. The great quantity of grease which the finest Spanish wool contains at the first washing, mixes with the lie-water, and makes it quite soft and soapy; but this grease is wanting in the second washing, so that the water is not in the least softened. If the first washing be well performed, the wool is by that means several per cent. cleaner than the foreign wool that is imported, which has not been washed after the shearing."*

In Silesia, the latitude of which corresponds with that of many of our finest grazing districts, the method usually practised simply consists in making the sheep cross a running stream, after obliging them to plunge into the water from a pretty high bridge.

The method chiefly pursued in Saxony, consists, first, in making the sheep cross a brook or river; on the second day, in the morning, they are again made to pass through the water, in which they are dipped, in order that the fleece may be uniformly penetrated; after which they are stroked, or pressed down with the hand, beginning at the head, and thence proceeding to the extremities of their bodies. They are also led once in the afternoon, across the stream; the fleeces are then allowed two days to become dry, and on the third day they are shorn. A shearer dispatches twenty-five sheep in one day. When an animal is wounded, the part is anointed with its excrements, or with a mixture of linseed oil and resin. The shearing ceases about three o'clock in the afternoon, that the sheep may have time to feed in the meadows, whither they are gently driven after they have undergone the operation. After the shearing, some graziers fold their sheep for two or three weeks, sending them proper rations of food.†

In Spain, the sheep are shorn in large buildings constructed for that purpose, and the operation is conducted by persons who are not themselves proprietors of flocks, but who make this branch of the management their peculiar business. The fleece is then assorted into the different qualities, and carefully washed in warm water; but not more than is merely necessary to cleanse it from impurity, as too much washing is supposed to render the wool brittle. The fleece is thus cut and stapled at the same time; and it has been asserted that 800,000 sheep have been shorn in the season at one of these *esquileos*, at Ortigosa, in Segovia.‡

In *washing sheep*, the use of water containing chalk should be avoided; for this substance decomposes the *yolk* of the wool, which is an animal soap, the natural defence of the fleece; and wool, often washed in calcareous water, becomes rough and more brittle. The yolk is most useful to the sheep in cold and wet seasons by the re-

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* Bakewell on wool, p. 72.

† See M. Lasteyrie's very valuable "Histoire de l'Introduction des Moutons à Laine fine d'Espagne dans les divers Etats de l'Europe, et au Cap de Bonne Espérance," &c. 8vo. 1802.

‡ Bourgoing: Tableau de l'Espagne Moderne, Vol. I. Ch. III.

sistance which its oily nature opposes to the rain; while it nourishes the growth of the wool, and also imparts to it a greater degree of softness and elasticity.

The *clipping*, or *shearing* of sheep, is performed in two ways, and either a barn, or a small shady paddock is usually chosen as the scene of operation. The first and most ancient, or common way, is done longitudinally, from head to tail; but this mode is attended with considerable difficulty, and is seldom well executed. The second, and improved method, consists in cutting circularly round the body of the animal, the beauty of which is, in consequence of this, believed to be increased, while the work is more uniformly and closely executed. The shearer holds the animal under him, either with his knee, or left arm, and clips the wool with a spring shears, which being without handles, he is enabled to manage with one hand, and thus performs the operation without assistance, unless the sheep are unusually strong and restive. The entire fleece is stripped at once, and rolled up together and the different qualities are afterwards sorted by the wool-stapler; but, previously to the sheep being handed over to the shearer, it is a good practice to clip off all coarse and kempy wool from the hips, legs, pate, and forehead, and keep it apart from the rest of the wool, in a bag or basket. This is particularly necessary to be observed in the shearing of lambs: for in lambs' wool, if the coarse part and kemps be suffered to mix with the fine, they never can be sorted out, and must spoil any fabric to which the wool may subsequently be applied, as the kemps will not take any die; and whatever color may have been intended, the article must be a mixture. Further, great care should be taken, in shearing, not to give the wool a second cut, as it materially injures and wastes the fleece.

During the whole process of shearing, the greatest care should be taken not to wound or prick the animal with the edge or point of the shears; otherwise the flies, abounding in the sultry heats of midsummer, will instantly attack the sheep, and sting them to very madness.

When shorn, the fleece should be carefully folded and rolled, beginning at the hinder part, and folding in the sides, or belly wool, as the rolling proceeds. When arrived at the shoulders, the wool of the fore part should be rolled back to meet the other, instead of having the binder twisted from thence in the usual manner, and the whole secured by a pack-cord in the common way in which parcels are tied up. Thus the fleece is kept much tighter together, and unfolds itself with more regularity under the hand of the sorter, who is otherwise much inconvenienced by the confusion or breaking of those parts of the fleece which, in the common method, are twisted together for the band.

In the preceding details, we have spoken of one annual shearing; but experiments have been made by some enterprising breeders, tending to show that, in certain cases, long-woolled sheep may be *shorn twice* in the year. The trial, however, has not been attended with any advantage; for although a trifling additional quantity of wool might be thus obtained, it would not be sufficient to pay for the additional trouble and expense: the quality, also, would be inferior in length of staple; and late shearing exposes the sheep to injury from cold. To meet this latter objection it has, indeed, been proposed to clothe them in flannel jackets, as practised by the breeders of the new Leicester rams; but although that may answer the purpose of Tup-masters who find their interest in supporting a peculiar breed of delicate sheep, it cannot be adopted generally, even if it were advantageous to the animal, of which many strong doubts are entertained. The external air and sun are necessary to the health of the sheep, which seems intended by nature, more than any other domesticated animal, for exposure to the weather. It is also probable that the system of clothing sheep is prejudicial to the growth of the wool both in strength and staple.

Mr. Ellman, of Glynde, clips off the coarsest wool on the thighs and docks of his South-down flock, (the first of that breed in this island,) about four weeks before the usual time of washing and shearing. The wool, thus severed, he sells as locks: each sheep yielding, upon an average, four ounces. He is said to find this method very beneficial, as the animals are kept clean and cool during hot weather; and from the success with which it was practised, it has been adopted in other counties with different breeds of sheep.

A more singular mode has for some years been tried at the French national farm, at Rambouillet, the result of which is stated to be, that the fleece of sheep improves greatly by being suffered to grow for several years; and that the fleeces of some sheep, which were shorn in 1804, for the first time for *three* years, and in 1814, for the first time for *five* years, were superior, in point of staple, to those which were annually shorn, and produced a larger sum. We state these facts for the consideration of the philosophic breeder; though we confess ourselves at a loss to reconcile them either with the generally received theory of the growth of the fleece, or with the effect of the very great degree of heat which the French sheep must have felt with such a weight of wool; especially, as it is the opinion of all well informed breeders, that excessive heat is equally hurtful to sheep as extreme cold.

Lambs have been usually clipped a short time after the rest of the flock; but, in this country, a custom has been lately introduced, of not, as formerly, shearing the lambs. The wool of the *Hoggets* thus acquires a great length of staple, or, as it is sometimes termed, a *longer nip;* it is chiefly used in the manufacture of shawls, and as it now commands a higher price than the other qualities, this is of the utmost importance to the proprietors of short woolled flocks: it is, indeed, the only kind of short British wool that has been, for some time past, saleable, except at prices that are ruinous to the grower.

After sheep have been clipped, it is usual to *mark* them with ochre, ruddle, or other coloring matter; but, as it sometimes becomes difficult to wash the stains of these substances out of the wool, a composition of finely pulverized charcoal, or lamp-black, (which is better, where it can be procured,) and tallow, mixed together over a moderate fire, with a small portion of tar to give it a proper consistence, will answer the purpose; and wool, which has been marked with such mixture, may easily be cleansed therefrom, by washing in strong soapsuds.

It is essential that a distinctive mark be given to ewe and wether lambs; which is easily done by notching one ear of either; and the same method may be employed, with some variation, to class them at the future stages of their growth.

Where, indeed, a pure, as well as a mixed breed of sheep is reared on the same farm, it will become necessary, in order to avoid mistakes, to distinguish those of the first breed with a different mark from that employed for the sheep of the second. Were this system carried still further, and each sheep branded on the cheek with a separate number, a judicious breeder would find it conducive to his interest to keep a register, in which the numbers of each sheep might be marked; here also should be carefully entered such observations as not only related to the coupling and crossing of the breeds, but also those experiments he may wish to try upon the animals. A careful cultivator, who is solicitous to improve his art, will, in such register, notice the defects, or other qualities of his sheep, their respective states of health or disease, the nature of their wool, the profit they yield, &c. Thus it will be easy to ascertain what individuals it will be proper to dispose of every year, as well as those from which it will be advantageous to breed; and, at length, the object proposed will be obtained, namely, the improvement of the breeds, and deriving from them the greatest possible profit.

[To be continued.]

SELECTIONS OF EDITORIAL CORRESPONDENCE.

[The two following scraps reached us about the same time, from nearly the extremes of north and south. Such statements may be new in print—but unfortunately they are no novelty in publishers' correspondence. *We* could furnish a long list of such subscribers—and still we believe that we are so fortunate as to have the best paying list of any publisher in the United States, who has to confide in the honor of so many remote and unknown subscribers.]

From the Genesee Farmer.

Black list.

Many of our subscribers have expressed their approbation of the proposed publication of the names of such subscribers as refuse or neglect to pay for the papers, and we shall continue the list as occasion may require. The following names have been added to the list of delinquents during the present month:

P. Lencham, Winchester, Tenn.	$5 00
Dr. T. W. P. M'Gimpsey, Columbia Tenn. "gone to Mississippi,"	9 00
Oliver Harwood, Rushville, N. Y.—"does not wish it any longer,"	6 41
Caleb Vanduser, Macedon—"not taken,"	2 70
Abram Ramsdell, Macedon—"not taken,"	2 70
Daniel Murray, Kankakee, Illinois—"wishes it stopt,"	5 00
John T. Hill, Columbia, Mo.—"not taken,"	6 45
D. S. Rossiter, New Lebanon,—"gone to Illinois,"	1 40
Samuel Barrows, Esq. Olean—"refused"	1 60
Andrew Poucher, Smoky Hollow—"will take them no longer,"	1 60

From the Southern Planter.

The following is one among the many epistolary favors we receive; and which if not among the most important, yet forms an interesting portion of an editor's correspondence.

Villa-Rica, (Carrol co.) Aug. 11.

Dear Sir—You will do well to stop your paper directed to John D. Chapman, as he has moved away.

Yours &c.

JAMES L. ADAIR.

☞ Mr. Chapman owes for the Planter $7.50

ON THE DIFFERENT KINDS OF COTTON.

To the Editor of the Farmers' Register.

Fairfield District, S. C. Oct. 3, 1835.

The cotton plant forms a subject of peculiar interest, both to the southern planter and to the botanist: and every thing relating to its history and character cannot fail to excite a lively attention. The articles on this subject in your late valuable numbers, from Mr. Spalding and Mr. Croom, have been read with much pleasure, and we should be much gratified to see the investigation continued. Although these gentlemen have shed much light upon the native localities of this plant, the period and manner of its introduction into this country, and the botanical characters of the different species, yet, we apprehend, the subject is not yet thoroughly understood. Its botanical history especially—the several species, and the botanical characters of each, we shrewdly suspect are imperfectly known, and, consequently, the botanical descriptions are very unsatisfactory. Mr. Croom has given the characters of all the species of cotton, as furnished by the Encyclopædia of Plants. But upon examination, this botanical account is found to be imperfect. To render my remarks more clear and intelligible, I will beg leave to transcribe the botanical descriptions given by Mr. Croom from the Encyclopædia. According to this, there are but four species of the cotton plant, as follows:

"1. Gossypium herbaceum, (green seed cotton.) Leaves 5 lobed, 1 gland beneath: lobes round mucronate, invol. serrate, stem smooth."*

"2. G. hirsutum, (Mexican and petit gulf.) Upper leaves undivided cordate; lower 3–5 lobed, with 1 gland beneath: branches and petioles hirsute."

"3. G. barbadense, (sea island cotton?) Upper leaves 3 lobed; lower 5 lobed with 3 glands beneath: stem smoothish."

"4. G. arboreum, (tree cotton.) Leaves 5 lobed polenate; upper 3 lobed, with 1 gland beneath, Inv. tern. Cal. with 3 glands at base."

Eight or ten years ago I substituted what is called the Mexican cotton in the place of the green seed: and for the last three or four years I have purchased annually, as many bushels of what is sold in the Charleston market as petit gulf seed, as would furnish seed sufficient for the succeeding crop; so that my whole crop now con-

*Mr. Eaton in his Manual of Botany, describes the g. herbaceum as a biennial. Certainly not so in this country.

sists of what we consider the petit gulf kind, with, perhaps, some remaining plants of the kind introduced some years ago under the name of Mexican. Upon careful examination of my own crop, and those of many other gentlemen who plant the petit gulf seed, I find the botanical characters to be as follows.

Upper leaves 5 lobed; lobes acute mucronate: lower 3 lobed, lobes acute mucronate, 0 glands, stem, branches, petioles and peduncles hirsute. Perianth 3 leaved, gash-toothed.

Now it is manifest, that this description does not apply to either of the species above described by Mr. Croom. It does not apply to the g. hirsutum (Mexican or petit gulf,) because, although it is hirsute, yet the upper leaves are not undivided cordate, but 5 lobed acuminate mucronate, whilst the lower leaves are 3 lobed, and not 3-5 lobed with 1 gland beneath.

It is equally manifest, that the description of what we plant as petit gulf, does not apply to either of the other three species. Is the kind, then, which we plant as petit gulf cotton, a fifth species? Or is it a hybrid? Be this as it may, we have found it so superior in point of productiveness, to the green seed, and it has so entirely superseded the latter, that I have not been able to find a single plant of the green seed kind growing in the neighborhood, with which to make a comparison as to its botanical characters.

That the plant which we cultivate as the Mexican, and that which we cultivate as the petit gulf is one and the same species, is manifest enough. The only difference we can detect is in the bearing and productiveness. Owing, perhaps, to its being a variety, or perhaps to the seed being fresh from the Mississippi, the petit gulf kind is earlier and more productive, at any rate for two or three years, than any kind we have ever yet planted.

Upon the whole, what are we to make of the description of the g. hirsutum, given by Mr. C. as the Mexican or petit gulf, from the Encyclopaedia of Plants? We plant no cotton of this description, I think, in this state. Of course, the question arises, have we been deceived in the seed imported as the petit gulf seed—or have the botanists been mistaken in their description of it? A further examination of the subject is worthy of the attention of botanists; and I would hope ere long to see the several species of cotton settled with as much precision as those of any other plant. This, I am sure you will perceive, is not a mere idle curiosity. The practical utility to the planter of being able to determine the species with certainty by a view of the growing plant, will strike you at once, as very important in several respects. And the botanist who may reduce the subject to accuracy and certainty, will not only render a valuable contribution to the science of botany, but he will confer an important favor upon cotton planters, and deserve well of his country.

JAS. DAVIS.

A LARGE YIELD OF CORN.

To the Editor of the Farmers' Register.

White Plains, Norfolk County, Oct. 21st, 1835.

I now send you, according to promise in my last, (dated the 6th of July,) the result of the experiment crop—not that the crop is of an extraordinary character, so as to deserve public record; but as the promise had been given, silence would have countenanced the impression, that it had resulted in a total failure—which was not the case. The quantity housed and measured was 115 bushels and five quarts per acre. There was a loss of many bushels by the uninterrupted depredations of my poultry, as it was planted not far from my poultry yard, and a heavy wind in July had prostrated the whole crop, so as to make it entirely convenient to their ravages—besides, the quantity that was lost by rotting and ruining on the ground, and the blight the corn received in so young a stage, by having the roots broken at the time it most needed them for maturity. Could I have been on the farm during the fall, the crop might have been saved from these domestic pilferers; but my health prevented. I only returned in time to witness its blight. The manure used was stable and ashes.

A. S. FOREMAN.

P. S. The corn planted was the Twin corn. obtained from James M. Garnett, Esq. of Essex.

Extract from the Worcester Sentinel.

IMPORTANCE OF LIME TO THE LOWER EASTERN SHORE COUNTIES.

* * * * *

Beds of marl, which are effecting such wonders in particular and extensive sections of Maryland and Virginia—it seems, from the opinions of practical geologists, are not to bless, with their treasures, that portion of the peninsula immediately bordering on the sea board; but provident nature has not left it destitute of a cheap, and efficient substitute. The shoals of shells in our bay accessible at low water, and in many places abundant, and the supplies derived from living shell fish, brought up for domestic consumption, will afford the material for lime, during many successive years. The time is not distant, perhaps, when stone lime will be burnt upon this shore, where wood is cheap and abundant, and labor low, from the lime stone imported by return vessels from the Delaware, as has been lately practised with success, in the neighborhood of of Smyrna; and will soon go into operation, at the head of Indian River, where shells cannot be procured, in sufficient quantities,for agricultural purposes. Unexpected beds of fossil shells may yet be discovered, along the sea coast, by the persevering and scientific exertions of professor Ducatel: the accurate and learned gentleman, employed in a geological survey of Maryland; a measure which reflects so much honor upon the wisdom and public spirit of your legislature; from which the happiest results have already been realized, and more extensive benefits may be justly anticipated.

The assertion will be sustained, by all the intelligent citizens of the Eastern Shore of Maryland and Virginia, at all conversant with agriculture, that a soil more susceptible of rapid and easy improvement than ours—more grateful in its returns to the hand of judicious labor, and more convenient and pleasant in its tillage, does not exist upon the face of the globe. A system of culture deplorably erroneous and exhausting, has been pursued for ages, which would have reduced to a state of abject sterility any other soil, in half the time. The active exertions of a few influential and enterprising individuals in each county, establishing agricultural societies as is the case in every county in the state of New York; exciting a spirit for extensive reading, of approved works upon husbandry; encouraging a judicious rotation of crops upon every farm, however small, of the three or four shift system; with the cultivation of clover, as soon as the state of the soil will justify it—recommending to all, the advantage of abstaining from grazing their fields—and above all, by introducing the judicious use of lime, or marl, in the way suggested in the *Essay on Calcareous Manures*, would in a few years, effect an astonishing change upon the appearance of our fields—and by inspiring the industrious cultivators of the soil, with the sure expectation of having their care and their toil rewarded with plenty, for themselves and their children, would restrain at once the emigration to the west, which is threatening to depopulate the Atlantic sections of the peninsula.

A late extensive tour through the northern settlements of Philadelphia county, where lime is universally used, and in immense quantities, and with effects upon the productions of the earth, so wonderful; has convinced the writer of this article, that nothing is wanting to the lands of the Eastern Shore of Maryland and Virginia, with the qualities of which he is well acquainted, but the adoption of a similar course of improvement and tillage, to render them equally fertile and productive. In many situations here, marl can be procured at a small expense; in all shell, or stone lime, at a cost inferior to that which is paid by farmers remote from lime-stone quarries in many parts of Pennsylvania.

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T HOLMES.

ON THE SCORZONERA HISPANICA (VIPER'S GRASS,) AS FOOD FOR SILKWORMS.

By M. Poirel.—Published by order of the *Horticultural Society of Lille.*

Extract, translated for the Farmers' Register, from the *Journal d'Agriculture, etc. des Pas-Bas.*

I have found in the *Annales* of the Horticultural Society of Paris, of November 1829, many assertions which, for the interest of our department, it seems to me to be necessary to be answered, in order to prevent the injurious influence which they might have on a subject of the first importance for us in the north of France, that of feeding silkworms on the black-rooted scorzonera—(*scorzonera hispanica*, or garden viper's grass.)

First in order, in the report of the proceedings of the council of administration of the Society, I have remarked the following passage:

"The Count de Murinais, communicates a note relative to the success of raising silkworms fed on the leaves of scorzonera, in the north of France, by an inhabitant of Lille. After a discussion upon this communication, in which many members, *without contesting the fact*, maintain the *impossibility* of obtaining advantageous results from silkworms fed with scorzonera, the council sends the note to the committee of publication, authorising it to add any observations that the committee shall judge proper."

They do not contest the possibility of raising silkworms by feeding them exclusively on the leaves of scorzonera, because indeed the evidence cannot be refused; they only deny that it is possible to obtain by this means, satisfactory results. Here, however, the evidence is not less strong, since it is notorious that crops of silkworms, fed on this substitute, were tested at Lille in 1828 and 1829; that samples of the silk obtained were exhibited at the Cabinet of Natural History of that city, where every one could appreciate their beauty, which was not below that of the finest silks of the South of France. As to the quality, the merchants of Lyons passed on it a sufficient eulogy, in offering 24 francs the half kilogramme for a considerable quantity, if it could have been furnished. They would have offered one franc and fifty centimes more, but for the imperfection of the winding, occasioned by the want of suitable reels.

The value of the product being established, there is nothing left to answer, but the reproaches directed against scorzonera. I find them at page 291, in the report made in the name of a special commission, by M. Loiseleur Deslongchamps, upon a nursery of white mulberries formed by M. Combet, at Fonteroy-sous-Bois. This is what the reporter says:

"In the laudable desire of seeing augmented the product of our indigenous silks, some persons *believing preposterously* that the principal difficulty existed only in the impossibility of procuring enough nourishment for the worms, have sought to find substitutes for the mulberry. But these persons *have not comprehended* that the substitutes, supposing them to be found, would hardly present the same advantages as the mulberry. In effect, those who have proposed the scorzonera, *have not seen* that this plant, (supposing even that it could produce a silk as good and as beautiful as that of the mulberry, which it is difficult to believe,) would furnish much less of leaves upon a given surface, than the mulberry; that it is a biennial plant, and that every two years it would be necessary to make new sowings, and that the crop would be subject to many more casualties than the mulberry, which when once planted, may last a century or more."

The persons who have proposed to raise silkworms in the north of France by means of the black-rooted scorzonera, have not done so as lightly as the expressions of the report would induce to be believed. These persons knew that the mulberry is not hurt by the most rigorous of our frosts, so long as, yielding to the influence of the climate, it remains without vegetating. But they also know as well, that the leaves, when once opened, may be destroyed, even in the most southern part of France, by late frosts. When this accident occurs in the midst of the rearing of the silkworms, there is no resource but to lose them, without being able to replace them when new leaves come out—either because there were no more eggs, or because that the heat of the season had hatched them spontaneously. It is then the fear of an entire failure of the food of these insects, and the hope of diminishing the expense of their rearing, which have induced the seeking for substitutes for the mulberry. The matter in question is no longer the possibility of finding a substitute—that is answered affirmatively and decisively by the results above stated. Neither is it even permitted to doubt as to the beauty and goodness of the silk obtained. The dealers to whom it was presented judged it without prejudice, since they were ignorant of its origin; and the price which they were willing to put on it, indicates sufficiently their favorable opinion of the quality.

The only point which remains to examine, and which is not the least essential, is to know if raising silkworms by this substitute, presents as much advantage as their being raised by the leaves of the white mulberry. It is objected—

1st. That upon a given surface, the scorzonera will not furnish as many leaves as the mulberry—

2nd. That the scorzonera is a biennial plant, of which the crops will be subject to many more casualties than those of the mulberry.

No comparative experiments having yet been made, nothing can be affirmed as to the relative quantity of leaves which a certain space would yield. It would also be necessary to examine whether if, with equal weights of leaves, the mulberry would not feed a greater number of insects than the scorzonera. Thus it may be seen that I go in advance of the objections—for this latter point has not been made.

Without wishing here to cut short the question, and knowing the insufficiency of my *data*, I limit myself to saying, that the scorzonera is not an annual plant, but a perennial, which lasts six years or more: that its culture is very easy, and within the reach of all persons: that our lands suit it perfectly, which is not the case with the mulberry: that the crop of its leaves is sheltered from all irregularities of weather, not excepting late frosts—so that one may commence the hatching of silkworms by the month of March, long before leaves of the mulberry can be had:* that we can, without inconvenience, take many cuttings of leaves from the scorzonera, commencing with the month of March on the sowing of the preceding autumn, and from the beginning of June of the sowing of March. Thus no delay will be experienced by those who desire to begin silk culture, and consequently, a new advantage is presented over the mulberry, which, admitting the mode of its cultivation to be the most favorable, requires not less than five years of respite before permitting a first gathering of leaves: even for that, it is necessary that the ground and the climate shall be proper for its developement.

Another advantage that the scorzonera offers is the usefulness of its root, as a culinary vegetable, during the two first years, and the excellent winter food which it furnishes to cattle when its greater age, and consequent degeneracy, forbid its admission to the table. It is then not likely that any one will think of continuing the same crop beyond the third year, unless for the purpose of obtaining a greater quantity of leaves.

If all these considerations are maturely weighed, it seems to me impossible that any one should determine to give an entire preference to the mulberry, and to give up the scorzonera, by adopting the opinion of M. Loiseleur Deslongchamps which rejects it positively, in the name of the commission of which he is the organ, and in these terms, page 232:

"To what good purpose, besides, to seek to substitute the mulberry by plants, which reason ought to tell us do not equal it in quality?"

And how will it be proved, especially by reasoning, that the leaves of the scorzonera are not in our latitude, as good nourishment for silkworms as those of the mulberry? Since the silk which we have made yields in no respect to that of the south of France, would it not be necessary, in the first place, to prove that the mulberry transplanted to the north, preserves all the qualities which it had in the south?—and who will venture to undertake to maintain such an argument, against all probability? I leave it to the care of those who will not fear to place themselves in opposition to the laws of the creative power, which, in the harmony of the universe, has wisely fixed each plant under the climate most suitable to its perfection.

I do not think that it will suit to substitute the mulberry entirely by any plant whatever—particularly where that tree fulfils the object proposed in the rearing of silkworms. But it was desired to make known to those whom it might interest, that they might, in certain cases, derive a powerful aid from the scorzonera—and to prove that, by its employment, we may hope to enrich the north of France with a new branch of commerce in much less time, and with more chances of success, than in limiting ourselves to the resources which the mulberry presents. * * *

[If the scorzonera deserves the recommendation given above, as food for silkworms, in a country where that branch of industry has made great progress, and where mulberry plantations are common, it will be far more valuable as a substitute in the commencement of the business, where years must elapse before mulberry leaves can be obtained from young plants. The substitute would not only (as in the north of France,) be useful during transient and unusual times of scarcity, caused by the destruction of the mulberry leaves by late frosts, but while our mulberry nurseries are forming, and before yielding their first crops. The remarks which we submitted in our last No. respecting the use of the black or native mulberry leaves, are still more applicable to the scorzonera; as this plant may be produced in abundance in a single season, where no mulberry leaves can be obtained. We are far from believing that this, or any other plant, can furnish food for silkworms as profitably as the mulberry tree: but if (as is stated by our author,) the cocoons produced from the scorzonera are of equally good quality, it is a matter of very little importance to the new silk culturist whether an acre of land may be the most profitable in the one plant, or the other, when both are in perfection. He might learn the proper management, and get over the inevitable errors and losses of a new beginner while using scorzonera as food, and before his mulberry trees were old enough to furnish leaves. From the proofs adduced, there would seem to have been no doubt of what the author asserted of the value of this new food for silkworms; but it must be confessed that there is a reason for supposing that objections have since been found, from the silence on the subject since 1830. We have met with nothing for, or

*The writer refers to the north of France. Ed. Farm. Reg.

against the use of scorzonera, since that time, which was the date of this publication.

We know not whether the scorzonera hispanica is raised in this country as a garden vegetable, though certainly nothing in our climate forbids, judging by the regions in Europe, in which it grows. It is a culinary vegetable—perennial, herbaceous—a native of Spain, and long cultivated in England. *(Encyclopædia of Plants.)* The root is carrot-shaped—is cultivated like salsify or carrots, and is eaten boiled like carrots or parsnips. The bitter flavor of the rind requires that the roots should be first scraped, and soaked in water. *(Idem*—also, *Kenrick's Orchardist, 2nd Ed. p. 365.)* Rozier calls it "a species of salsify. The flowers are "yellow and the leaves toothed—the root, black on the "outside, is white within. In the middle and north of "France, this root is not eaten but in the second year: "it occupies the ground then longer that salsify, and "in that respect, its culture is less economical; howe- "ver, the root of the scorzonera is generally preferred "to that of the salsify, as more tender and delicate." —*(Cours Complet etc.*, Vol. VI. Scorsonere.) ED. FARM. REG.

RAKING AN INVALUABLE REMEDY IN COLIC, &c. WITH HORSES.

To the Editor of the Farmers' Register.

Though this communication would more properly belong to the *Farrier*, yet it will not be amiss, I fancy, to offer it to the farmers through the medium of your truly useful and valuable periodical.

Raking is an operation, which in several cases under my own immediate observation, has been found really "an invaluable remedy in cases of the colic, constipation of the bowels, &c. &c., in horses."

Whenever the horse shall become affected with the above specified complaints, it is common to administer a purgative of some kind: if this should fail to produce the desired effect, the *inexperienced groom* administers another and another until the sufferer dies—merely for the want of a passage from the bowels.

Now *raking*—though an indecent operation—I venture the assertion, in ninety-nine cases of the hundred, will attain the desired end—viz: *an evacuation from the bowels.*

I will, for the information of those unacquainted with the *modus operandi*, describe the manner in which it should be performed.

Place the horse in a situation to prevent him from doing injury to the operator by kicking, and push the hand into the abdomen, until a hard lump of the fæces is felt—(here, by the way, I will observe, that this hard lump is the cause of the suffering to the animal—) push the hand backwards and forwards, until the lump is removed.

It is not unfrequently the case, that this operation should be performed several times; but I will hazard the assertion, that an evacution of the fæces will be obtained in *every* case in which the above-mentioned directions are followed. It is scarcely necessary to remark, that there will be no occasion for this operation, should there be no inability on the part of the animal to void his fæces.

A GREAT HORSE DOCTOR.

Oct. 20th, 1835.

ON THE CHOICE OF SOILS FOR APPLYING PUTRESCENT MANURES.

To the Editor of the Farmers' Register.

A writer in a late No. of the Register doubts whether or not it is more expedient to apply manures to a soil of a good quality, or to that which is inferior. The author of "British Husbandry," in the Farmer's Series of the Library of Useful Knowledge, says, on this subject—

"There is, indeed, evidently a mistaken practice throughout most parts of the kingdom with respect to the application of manure. The custom alluded to, is, that of laying it upon land of inferior quality—while that of a superior kind is in equal want of improvement; the better part of many farms being thus in some degree impoverished by attempting to improve, at an evident loss, the poorer parts. Others, indeed, follow the opposite system; but, when justice is done to the land, every part in rotation, should receive the manure arising from its produce. There are, however, some rare instances of ground of so rich a quality, that by laying any manure upon it an injury would be sustained. But upon the whole, it is an evident fact, that any manure whatever—if not of a nature unsuitable to the soil—will be always attended with a proportionately better return when laid upon good, than upon poor land."

The above view must strike with peculiar force those who observe, in Virginia, even under the most judicious management, "the better part of many farms impoverished by attempting to improve the poorer parts."

It is with us, almost universally the practice, to bestow our putrescent manures upon the poorest spots with the hope of raising them to an equal degree of fertility with the rest. Is this hope ever realized? Is it not frequently the case, that equal sterility, rather than equal fertility, is thus attained? It would seem more wise, to fertilize by the application of our manures, the acre which has produced five barrels of corn, so as to make it produce ten barrels, rather than to cover the barren land with the same quantity of manure, which would not produce more than three or four barrels, under the most favorable circumstances, and with double labor. Where our fields are chequered, as they too often are, with these poor spots, there we might apply calcareous manures with most advantage, whilst we applied the putrescent to good land to make it still more productive.

I offer these hints with diffidence. I hope that a better farmer than myself will give light to your readers upon this subject.

E. T. T.

Nov. 3, 1835.

Queries. Is it not better to *improve* fifty acres of land so as to produce ten barrels of corn per acre, than to cultivate one hundred acres which will produce five barrels per acre? Is it not a common error with our Virginia farmers—our attempting to cultivate *too much* land? Ought we not to enrich half the quantity of land we are in the habit of cultivating, and to till it well—or ought we to add to our fields year after year what new land we can clear, putting our farm-yard manures upon the *galls* and poor places?

Will *meadows* sown in *timothy* and *herds grass* in August last, be improved by a dressing of plaster of Paris next spring? A ser ous answer to this query will oblige

E. T. T.

For the Farmers' Register.

REASONING OF BRUTES. ANECDOTES OF CATS.

There has been much idle discussion on the question whether other animals besides man exercise reasoning powers, or are always guided by instinct. Although this is one of the many subjects on which "much may be said on both sides," it has always seemed to me clear that all animals (man included,) possess and exercise both these powers, in greater or less proportion—the more perfect animals, as man, and the elephant, and the dog, having most reason and least instinct: and the lower orders, as insects, possessing the most admirable instinct, and the least of reason. Still man has some instinct, and the ant exhibits still more evidence of having some share of the reasoning faculty.

Domestic animals, by ages of servitude to, and companionship with man, have not only departed greatly, as to each family, from their original wild character, but many individuals seem to have learned more than others, and to exhibit feelings, as well as acquirements, different from all others of their kinds. Many well attested and interesting accounts have been published of such facts of elephants and of dogs, the animals which can best profit by man's teaching, and even seem to share his passions and feelings. I shall state a circumstance of another, and the least tamed and docile of all domestic animals, the cat, which exhibits every appearance of the possession of not only reasoning, but of feeling. The circumstances were witnessed by all the members of a highly respectable family in my neighborhood, by several of whom I have heard them stated—and in such manner as to leave no possible doubt of the correctness of the details which will be here repeated.

A female cat that was nursing her litter of kittens in the cellar of the mansion house, died when they were so young, that in most such cases it would have been deemed a more merciful plan to drown them, than to attempt to raise them. But as cats were then scarce about the house, and the rats and mice very numerous and destructive, orders were given to use every care to nurse and raise the young kittens. The cellar in which they were, was generally open, being partly a kind of lumber room, and frequented continually by the servants in their different occupations.

Writers on natural history have treated the cat as devoid of all affection or kindly feelings for its owner, and indeed for every thing else but *self*—that caring for nothing but what conduced to its own comfort or pleasure, the cat was a complete exemplification of a being altogether selfish. Such is truly their almost universal character. In addition, we know that however tame cats become in the houses where they live, they still remain as wild animals at others, and in the presence of strangers—going abroad by stealth, and at night—and flying in alarm from the approach of every footstep. The cats raised in our negro-houses, are very fearful of approaching the "great house," and rarely venture to do so except at night, and when attracted by the company of their own species.

At one of the negro's houses, about 100 yards distant from the mansion, another cat had kittens of about the same age of those left by the one that died. This one, as usual, had never been seen at the house, and probably had never ventured there except in their customary roaming at night. The next day after the death, this "quarter cat" was seen carrying off one of the orphan kittens, in her mouth. She was chased, the kitten taken from her and brought back. It was not long before she returned, and repeated the attempt, but with the same ill success as before. She had to pass through a considerable distance exposed to detection, and could not, without being seen, escape with her burdens. The report of these attempted abductions, and the singularity of the circumstances, caused the family to attend with curiosity to her proceedings, and left the poor animal the less chance of success. She continued however, for several days, (the door of the cellar being then always open) to carry away the kittens, without being able to escape, undetected, a single time. At last a new and more interesting movement was seen. She was bringing one of her own kittens to the cellar—and being left undisturbed, she soon brought them all, and placed them with those which she was so anxious to nurse. There she took her place in spite of her fears, and nursed both litters as long as they needed it. Of course she, and all her charge, had every aid of food, and care from the ladies of the family.

Another anecdote of a reasoning cat will be stated which was told me by an intimate and valued friend, whose habits of observation are remarkable for strictness and care, as are his statements of every kind for the most entire correctness. He had a cat raised in his house, and as tame as usual under those circumstances. But whenever about to produce her young, she would take refuge in some out-house, not inhabited. There she kept her kittens until they were old enough to begin to eat—and then with every litter her course was always to bring them one by one, (held according to their mode of transporting them, by the skin of the back,) and lay them on the hearth rug in her mistress' chamber. For experiment, they were sometimes taken up and carried back, and more than once in the same instance. But she would patiently repeat her labor, and continue to bring them and lay them on the rug, until they were permitted to remain, and were fed and taken care of. This cat was a bad nurse, and generally lost some of her kittens, even with the aid thus obtained. No words could have been used to express more strongly than her conduct, the prayer to aid her in her maternal duties.

E. R.

EFFECT OF BONE MANURE ON CORN.

To the Editor of the Farmers' Register.

Brookfield, (Henrico) Nov. 6, 1835.

In a number of the last volume of your Register, a correspondent describes an experiment made by the application of bones as a manure for corn, the result of which, as reported, seemed to prove that corn derived very little benefit from their application. From long experience in the use of bones as a manure, and a knowledge of their highly fertilizing properties, I was induced to make a similar experiment on a small scale. During the last winter, I got the negroes on the plantation, for a small premium, to collect at their own convenience, a quantity of bones from around the neighborhood, and during wet or stormy weather, had them broke in a wooden trough with pestles shod with iron, into as small pieces as my time would permit, a small proportion of them being reduced to a powder. At the time of planting the corn, I selected four rows, forming an intermediate space between ground well manured from the winter farm pen, and ground not manured. On these selected rows, I applied the bones thus pounded, depositing a small quantity of the bones previous to planting the corn in each hill, afterwards dropping the corn, and covering the whole with the hoe, not deeper than any other part of the crop. At a very early stage of the growth of the corn, it exhibited a superiority over that growing on either side, and maintained that appearance throughout the whole of the season, the difference being discernible at a distance. There were two stalks cultivated in the hill, at five and a half by three feet, the greater proportion of the stalks producing two good ears. Throughout the whole of the season it maintained a vigorous and rapid growth, and when the corn on both sides of these rows exhibited evident symptoms of having suffered injury from a short drought, the corn on these rows was apparently uninjured. In cutting and clearing off the corn, preparatory to seeding wheat, much of the general crop was very imperfectly matured, while the corn raised on the bone manure presented a much smaller proportion of imperfect ears. Circumstances prevented me, as I had intended, from ascertaining the exact difference of produce—but gentlemen who were competent judges, estimated that the produce from these four rows would exceed the produce from an equal number of hills from the farm pen manured land, by at least one-third, and more than double that of the land which had received no manure. From the result of this experiment, I am satisfied that bones are a valuable manure for corn, if applied even in very small quantities. The expense of them would be small, and they are much easier pounded, when performed as above stated, than gypsum, and the expense of collecting and hauling is very trifling. On every farm there are a greater or less quantity of bones scattered about, and in the vicinity of every village or city, they are deposited in large quantities, presenting any thing but an agreeable or pleasing appearance, reminding the passenger at every step that he is, as it were, in the midst of a charnel house. How much better would it certainly be that the tiller of the soil should enjoy the full benefit of their enriching qualities, and that these animal remains which now present nothing but a loathsome spectacle, should be employed to beautify and fertilize the soil which once afforded them subsistence, and instead of presenting an eye-sore to their late masters, be to them a source of profit?

I regret that circumstances so occurred as to prevent me from having it in my power to present you with more practical results, than are above stated. As it is, I hope it may induce some one of your readers to bestow some attention on a means of improving their exhausted farms, within the reach of almost every farmer. I anticipate that the benefit which the wheat crop may receive from the application of the bones, will be as decided as has been that of these four rows of corn.

A. NICOL.

DESULTORY OBSERVATIONS ON THE IMPROVEMENT OF VIRGINIA. SILK CULTURE—MARLING—FEMALE LABOR.

To the Editor of the Farmers' Register.

Moor's Mount, Nov. 4, 1835.

I have just now received your November number, and coursed over its pages. It had been my intention to make a communication for your useful work about this period, and your complaint in this last number of the falling off in the contributions detailing practical results, decides my mind to write you forthwith, to present some few practical results, proceeding from a few of my humble operations, upon an estate lying on the banks of the Rappahannock, which has, under the corn and wheat rotation of cropping, after seven years' experience, proved so unprofitable in comparison with cotton planting at the south, that for several years back, I have sought more lucrative employment for part of my slaves, on a Florida plantation. It is true, by the use of clover and plaster, and a slight *nibbling* at a marl bank, I have put a new face upon the land—luxuriant clover greeting the eye, (and after August the mouths of my stock,) in place of hen grass and life-everlasting. This practical result, valuable to the country, has in labor and money, cost me, we may say, the full price of the "Indian's gun," and but for its being encountered upon a most desirable homestead, would have been, in comparison with the application of labor and investment of capital in many other situations in the south and west, very injudicious management. For had my circumstances confined my dependence for income to meet the expenses of living, to the profits of this farm, I should have been reduced to a most rigid parsimony, to have "made buckle and tongue meet," although I have worked from 12 to 15 hands. Wheat has been my market crop, and so general has been the destruction by the fly, that five hundred bushels has been about the average crop, from 100 acres sown. But for the ravages of this unrestrainable, irresistible pest, I am confident my fields since taken with clover, would produce 1000 for market, which at one dollar per bushel, would give a yield equal to 6 per cent. upon the capital, with progressive improvement by continuance of clover and plaster, and more spirited resort to my marl banks, which have been much neglected in consequence of having several hundred acres to clear up, in order to get regular fields, and a partial reclaiming of a piece of marsh rendered valuable meadow, instead of a nuisance, which produced much fever both at home and in the family of a near neighbor. With six per cent. produced annually, progressive improvement, and increased value of slaves, a reasonable man should be content to enjoy life with his relatives, and friends of his youth, without being allured by an insatiable avarice, to turn his back upon the home of his nativity, with all its endearments, to plunge into the forest with all its privations, and dangers of acclimation. But this infernal pest, the Hessian fly, (and a curse on the memory of George III. and the German Prince, who sent them with the cut throat band of mercenaries,) presents the only bar to the Virginia farmers clearing 6 per cent. and by curtailing his principal auxiliary, and main market crop, in a large portion of the state, reduces his profits to three per cent. and perhaps less than that. Hence, with the increased facilities of emigration to the cheap rich government lands of the south and west, a constant overflowing stream of population and wealth, has flown from the Old Dominion. And for the last ten years, since the policy of the federal government has been to force off the public lands at the minimum of $1.25 per acre, and more especially, since the high price of cotton, this exhaustion of our wealth and population, has been fearfully accelerated. Men will not forego the prospect of doubling their fortunes by a travel with their families some eight or nine hundred miles, and delve on through life, struggling with the disadvantages of farming at a profit of 3 per cent. when, by the change, a prospect so much more cheering is displayed. These observations apply to the proprietors of the country; but how much more forcibly do they apply to the larger class comprising tenants, overseers, mechanics, or to use a northern and European phrase, which by the way I do not admire, the "working men" of the country. These are part of the bone and sinew of a country, and their loss is irreparable. The home-loving Virginian mourns their departure, and alas! how often has he done it for several years past, while family after family, and scores of young men have swung from their native moorings, to people and enrich Alabama, Mississippi, Louisiana, West Tennessee, Missouri, Illinois, Indiana, Florida, Arkansas, and even Kentucky and Ohio; yet after they have become themselves hives to send out their swarms.

It is a sad and gloomy thought for us who will cling to our mother's bosom, and die with her ancient flag over us, that she is so retarded in her progress in the race with her sisters of the union; and patriotism—Virginia patriotism, restive at the sight, naturally casts about for some means of alleviation, and some grounds for consolation. I think it is obvious, that if a new direction to labor in a considerable degree, could be given for producing more certain staples than wheat, and less scourging than tobacco, in which female and juvenile labor would be more generally and lucratively employed, that we might anticipate the happiest results. Regarding the absolute unprofitableness of female labor, as well as of boys and girls, black and white, in Virginia, and the oppressive legislation of congress, as rendering all supplies not raised at home dear, in comparison with the prices of our staples, coupled with the ravages of the Hessian fly on wheat, as the principal causes of Virginians being driven into exile, I have anxiously sought for means of relief. As a Virginia patriot (and when I cease to be one, sectional as may be the feeling, it will be time for me to emigrate,) I have deemed it a sacred duty to endeavor to sustain her in her untoward situation. and trust I have contributed my humble mite in coming to the rescue, although I have located an interest far beyond her borders.

Although I regard the above three causes of Virginia's depression as having been mainly operative, yet the first, I think, has certainly been most so of the three; and since the second, by the arrest of the unjust and unconstitutional protective tariff (thanks to gallant South Carolina,) and the approaching termination of the supply of rich government lands, will be greatly reduced in its operation upon us; and the last is regarded by me as hopeless of cure, my attention has been mostly directed against the first evil. Female and juvenile labor consumes more than half in every community, and of how little avail is their labor in Virginia raising corn, wheat, and tobacco, which are the three only staples! Her mining, fishing, mercantile and grazing interests yield hardly any employment to them. Hence they rest as an incubus on our productive labor, instead of sustaining themselves, and even adding to the income, as is the case to the north. There, a father's income increases from the joint labor of his sons and daughters, as they are raising—and this is the case in a cotton growing country like the south and south-west; while here, the more children, the more indigent the family. And with the slave holder, if his slaves breed rapidly, he will be found in arrear in a few years, and to square himself from debt, must pick a quarrel with one or two in order to screw his and his wife's feelings up to the selling point, to prevent the sheriff from seizing some one that may be dearer to them. In the non-slave holding states every species of manufacture has been introduced, under the fostering stimulus of federal protection, and the energetic enterprize of an industrious people. I have travelled amongst them principally with a view of discovering some plan for the improvement of the condition of our poor and laboring classes, and for deciding whether it is not possible to turn the oppressive incubus upon male labor, in the unprofitableness and want of employment of female and juvenile labor, into an active auxiliary source of support, and even of income.

The result of my observations and reflections is, that capitalists should, as they doubtless can with safety and profit, embark in manufactures to a ten-fold extent. Our streams present cheap propelling power. These factories would afford much remunerative employment to women, boys, and girls, both black and white, and render us less dependent on the north, whose apathy in suppressing our most cruel foes, the impertinent incendiary abolitionists, admonishes us to lessen our intercourse with them, and seek more independence of their supplies, by raising them at home, on better terms—especially such, the production of which affords lucrative employment to females and youths of both sexes. Our land holders, I think, should try to supersede wheat, except on the highly improved lots, by mingling the culture of the mulberry (the Chinese) and introduce the raising of raw silk for manufactures, which would doubtless spring up in a silk raising country. This branch of industry now being introduced in the less genial region of New England and New York, will, if introduced into Virginia, afford the greatest and most beneficial and suitable employment for our unproductive classes. The raising of the orchard—feeding of the worms—managing the cocoons and eggs—reeling the silk—all admit of women, boys and girls; the two last at an age when their labor is for most other purposes, utterly inefficient. The reeling process can proceed during the winter months, which is a great consideration. That our soil and climate is better adapted to the mulberry than farther north, I think highly probable; and our summer and fall is long enough for two crops of cocoons to be raised to equal advantage. The leaf is sufficiently unfolded by the middle of May to begin to feed, and by the 20th of June the first crop will stop feeding, and by the 1st of July the crop of cocoons will be cleared off. While they are being prepared for the filatures, the second crop of eggs will be ready to hatch, and the 1st of August, or perhaps the middle would be the best, the second plucking of leaves would commence, so that about the 20th September, all feeding would close. The Chinese mulberry trees, and even my white Italian, have barely cast the leaf. Now, therefore, no apprehension could arise upon the score of early frosts, as September gave us tobacco killing frosts, without touching these mulberry leaves. I am so much encouraged from my personal observations at the largest cocoonery in the United States, (Mr. Whitmarsh's in Northampton, Massachusetts,) that I am preparing to go in for an orchard of 15 acres, and accommodations for five millions of worms, which upon the two-crop system, as contemplated, will admit of doubling, and of course, requiring an addition of five or ten more acres to the orchard, in order to have an abundant supply. On getting my establishment in full operation, I count upon giving employment, of a lucrative character, not only to my own women and young slaves, but to many of the neighboring poor people, and to hire of some of my large slave holding neighbors their negro chaps in leaf-gathering time, at a price that will render them better than mere consumers.

I am happy to find that I shall not grope my way alone in this enterprise, as your correspondent Mr. J. B. Gray, over the river above me, says he is going largely into the business. He has the means and youthful energy for the laudable undertaking, and every patriot should bid him "God speed." Eastern Virginia is not a country fit for grazing to advantage, in comparison with the western or northern states. And the south has the rich staple of cotton, and the far south, sugar. We must call in new articles, better suited to the country than small grain or grass, and with the culture of silk, madder, broom corn, and wheat, on rich lots, combined with our best staple, Indian corn—the encouragement of home manufacturing establishments, especially such as will afford females and children lucrative employment, I think with these improvements the day would be hastened greatly, when the tides of emigration would cease to flow, and the Old Dominion begin to raise her venerated head once more. The mother of states must not become a howling wilderness. The land of the most illustrious of American heroes, sages and statesmen, should not be cast in the shade. It is not because of negro slavery that she pines, as is ignorantly charged by the fanatical abolitionist, and even the philanthropic colonizationist, but from the causes which I have adverted to in the preceding part of this desultory communication. A bare reference to the annual supplies of emigrants, and attendant wealth, all lost to her, will suffice to refute this idea. Let this sluice be shut, and the plan of giving lucrative employment to females and the youths of both sexes, and a few years will prove the fallacy of this argument against slavery, which is upon the tongue of every whip-stitch politician, and northern and southern abolitionist and colonizationist.

Before leaving this topic, I must express my thanks to your enlightened and philanthropic correspondent, "Polecon," as he subscribes himself, for his able communications touching the low wages of women. I feel a natural sympathy with him, because his mind has been running with mine upon this interesting subject. I trust his strong pen is not laid aside, and that we shall hear from him again, and that under his own name. Such a writer has no cause to withhold his name from the public, and I am sure his manly and just remarks upon the trade of tailoring, as engrossed by our sex to the injury of women's prospects, if they gained him the growl of one knight of the thimble, would bring, as a set-off, the grateful smiles of a host of fair seamstresses that are held in subordinate dependence by their ungallant and selfish encroachment upon the proper sphere of woman. I will not shrink from uttering a suggestion here, that occurs to my mind, as an additional means of restoring this branch of industry to the sex to which it appropriately belongs, and that is, for the associations your correspondent recommends in behalf of female labor, to have an auxiliary, in resolutions on our part, to give a preference to female tailors, in all cases, and female associations, to place male tailors in a state of "coventry," in reference to social intercourse, and even the important article of marriage. I wish the worthy fraternity no harm, because I wish them to follow a manly employment, not invasive of female rights and duties.

I have, you see, wandered away from the promised detail of a few practical results, into this interesting field of mingled observation and speculation, with hardly a spice of practical experience intermingled. I alluded once or twice to marling, which is a favorable theme with you, and I will now proceed to state my observations upon the results of a slight essay at it, made about seven years ago. It was with blue marl, which abounds in this region, with thin layers of shells of various kinds interposed—the blue, where no appearance of shell, retaining the shapes left by them. They have been decomposed, and I think, in the process, formed sulphur, copperas, plaster of Paris, or gypsum, and perhaps other elements which may be detected by a strict and accurate analysis. Certain it is, that the blue marl, as we call it here, is a valuable improver of land. It acts as lime, in rendering the soil more permeable and easier to work, destroying weeds, and causing hen-grass and broomsedge to vanish, to make room for white clover—and if red be sown, to make that thrive astonishingly. Its effects on the two cuts I tried it on, seem very durable. One was used in the hill with corn, mingled with the earth, about a hoe full to the hill, chopped in, and the corn planted in the mixture. It trebled the product in corn, and the wheat which was ventured to be sown, from the fine crop of corn, showed double as rank, just as the marl was spread partially, by ploughing in and harrowing. The clover was equally uneven. Where the marl reached, it grew knee high, and was deep colored; elsewhere ankle high, and being of pale color, though both was equally plastered in the spring. Where I spread broad-cast at the rate of 100 bushels to the acre, the crops of corn, wheat, and clover have attracted observation by all travellers. I have taken a crop of one kind or other from it every year; the second growth of clover seeming to keep up the fertility, and rather to increase it, I think. Certainly the crop of clover was better this year than when cut before. The piece marled in the hill has never been aided by manure; has been cropped in the same way, and that is much improved. I cut a good crop of clover from it this year, and observed the same rank spots where the marl reached, as at first. While my mulberry orchard is growing, these two years to come, if I live, I shall, now that my heavy clearing is over, enter into marling with some spirit. I am encouraged to do this, not only by my own experience, but that of many others. Mr. William Jessee, and others in Middlesex, and Mr. William Wickham and Mr. James T. Sullon in Hanover; besides many acquaintances in King William and around me. My neighbor, Mr. John H. Bernard, Francis W. Taliaferro, and Henry Tayloe have all demonstrated the great value of marl, both shell and blue, upon their estates.

Your valuable work on calcareons manures, and the Register, have given a happy impulse to this essential means of improvement. The community is having its eyes opened to the fact, that permanent improvement of land is impossible without the use of marl or lime, to fix the putrescent matter in the soil, and give activity to its capacity for generating the proper salts and other ingredients on which vegetation feeds. May the good work increase and prosper! It may be truly said, that every man who marls an acre of land, is a benefactor to his country, and deserves the thanks of the community.

In conclusion, I will give you another statement of a trial which I have made, which cost little, and has satisfied curiosity.

About this time last fall, in hunting by the side of my spring branch, below the great fall of it over a blue marl bank, I came across a large bunch of gama grass, with fifteen or twenty seed stems seven feet high. Last spring I took up the bunch (about ten inches diameter,) and separated the plants by the roots, and transplanted a row on the side of my garden paling, and about as many more, (say fifty,) in lively land near where I found the bunch, and worked both once to keep them clear of weeds. Those in my garden are rankest of course, but grew so slow and puny, although in rich soil, that I am satisfied our climate will not permit it to be of much account—at least, not worth the attempt to raise a lot for summer soiling, as I had hoped. I shall have a fairer experiment in the next year's growth, as the roots get better footing and more vigorous. I find the seed ripen by degrees, and drop as quick as ripe, so that it is hard to save the seed of it, and I fear the early frost has injured most of them, though the blades are untouched.

JOHN DICKINSON.

STATEMENT OF TILLAGE AND PRODUCT OF CORN, ON STAUNTON BOTTOM LAND.

To the Editor of the Farmers' Register.

I have been requested by two or three of my friends, who saw a small field of corn growing the present year on my premises, to give an account of its produce, to the public, through the columns of the Farmers' Register. I have measured and penned the corn that grew on three acres of the above mentioned field, and will confine my remarks to the three acres, which were the best in the field. I do not recollect the precise time when this corn was planted. I commenced planting about the time my neighbors did, and the field was planted several days later than my first planting; so that I conclude it was neither late nor early planting. The ground it grew on was the best Staunton river bottom, which had been cleared upwards of a century. In the year 1833 it was not cultivated, and produced a fine coat of vegetable litter which was suffered to rot (ungrazed) on the land. The succeeding year, 1834, it was cultivated in tobacco, and in 1835 planted in corn. The spring ploughing was a bed upon two shovel-plough furrows for half of the three acres, and the other half was bedded on two coulter furrows. The bedding was done by two-horse dagon ploughs, as deep as practicable. I generally prepare my flat land with three-horse ploughs, but this field had been well broken, under the previous tobacco crop, and the two-horse ploughs effected as deep ploughing as a three-horse plough would, on a naked fallow. The beds were about four feet apart—rather under that distance. The corn was planted eighteen inches apart in the bed, (in the step, as it is usually termed,) and two stalks were left in a place after weeding. At weeding, the beds were thrown down by a dagon plough, and a deep coulter furrow run on either side of the young corn—as near to it as practicable. The second and last working was done by a single-horse dagon plough, the rows being too near to admit two horses abreast. The produce of the three acres was fifty-five barrels of sound corn and several barrels of rotten, that were not measured—making upwards of eighteen barrels of sound corn to the acre.

My principal object in making the above communication is, to direct the attention of corn planters to the subject of thick planting on rich, moist land. There is much land in this vicinity as fertile as the land above mentioned, and yet, the product to the acre seldom exceeds nine or ten barrels.

The three acres were accurately measured, and, to prevent misapprehension, it may be proper to add, that ten bushels of corn in the ear were allowed to the barrel. Two rows were permitted to stand with only one stalk in the hill: these were gathered and measured with two adjoining rows with two stalks in the hill; the latter measured between a fourth and a fifth more than the former, thus conclusively determining the advantage of thick planting. The two rows with only one stalk in the hill were thinned at weeding time.

The little experience I have in farming and planting, has convinced me of the great importance of making the land we cultivate rich—"cultivate less land, and make it rich" should be the motto of every planter, without an exception, of my acquaintance.

The corn that grew on the three acres was made at a fourth (at least,) of the expense of any equal quantity of the balance of my crop—the corn in the same field with the three acres excepted. In the first place, when a small crop is cultivated, so much time may be devoted to the first preparation of the field, that but two workings are necessary. Less land and less labor is required to produce the same result. I observed in getting up the corn, (it was hauled on the stalks to the farm-pen,) that the carts were filled more rapidly than they were in the poorer fields, owing to the fact of the thick corn being more concentrated. The cutter would generally at one stroke take down two stalks; the laborers that picked up the stalks have less walking to do; the fodder and tops are also gathered with less expense.

The ratio of increase of the number of ears, as the distance between the corn stalks is diminished, is greater than one would, at first thought, suppose. For instance, if one plants his corn three feet apart every way, he has 4840 corn hills in the acre; if he just doubles the distance and plants six feet apart, he has only 1210 corn hils in the acre: increasing the distance by the multiplier two, diminishes the number of hills by the divisor four. So that, if the ears of corn were as large, and the same number of stalks in the hill, an acre of land that would produce five barrels when the hills were six feet apart, would produce twenty barrels when the hills were three feet apart. This fact at once shows the great loss from not planting corn as thick as the land can bear it. The advocate for thin planting would say, that "what is gained in number by thick planting, is lost in the size of the ear:" but in the two cases put above, the ear must be four times as small in the thick acre in order to reduce the quantity to an equality with the product of the thinly planted acre. Nothing is more common (when instituting a comparison between two fields of corn) than the remark, "that one field is better than the other *because* the ears of corn are larger," and, "that the corn in the small eared field was planted too thick, *because*, the ears might be larger by thin re-planting;" whereas, in nine cases out of ten, if the corn in the two fields was brought to the measuring tub, the thickly set field would be found to yield the most corn.

The size of the ears that grew on the three acres above mentioned, was so large, that I am convinced the corn was not thick enough, and have in mind to try still thicker planting next spring. The experiment will of course be confined to low moist land: as the want of moisture would as effectually check the growth of extraordinary thick corn, as the want of fertility.

I will add, in conclusion, that a good cart load of pumpkins grew on the three acres, and that Mr. John R. Elam witnessed the corn accurately measured.

G. W. READ.

Charlotte County, Nov. 5, 1835.

From the Romney Intelligencer.

MAMMOTH APPLE TREE.

We are indebted to a highly respectable gentleman of Hardy county, [Va.] for the following facts relative to a mammoth apple tree, on the farm of Capt. Daniel McNeil, of that county. Our informant says he took the dimensions of this mammoth apple tree carefully and accurately, and found it to be 45 feet in height and 55 in breadth; circumference of the trunk 9 feet 4 inches. About seven feet from the root there are eleven branches, the average size of which are 3 feet 10 inches in circumference. But the most remarkable fact about it is, the quantity of fruit it bore the present year—one hundred and eighty bushels of apples were taken from it this fall. Four or five bushels, of such as were bruised and partially and entirely rotten, were left under the tree: and a good deal of its fruit must have been taken away by different persons through the summer and fall; so that the real quantity it bore must have been very near, if not quite two hundred bushels. The apples are very large. It stands near the South Branch, on very rich soil. I have been informed that it did not bear any fruit until after it was twenty years old. It grew spontaneously where it now stands, and, although forty years old, continues to grow.

From the Farmer and Gardener.

RIBBON GRASS.

Plainfield, Windham Co., Ct.

DEAR SIR—I received a letter from you, a short time ago, requesting information concerning the ribbon grass [*Phalaris Americana*.] The grass you saw at Plainfield, on Mr. Woodward's farm, two years since, I was informed originated from the ribbon grass. It was originally cultivated in the garden for ornament, where it spread, to the great annoyance of the vegetables. Mr. W. became dissatisfied with it, dug it up, and threw it over the wall into the mowing lot, where it continued to grow luxuriantly. Being determined to get rid of it, he again took it up and threw it into the brook. It was so tenacious of life, that it seized upon the watery element and spread rapidly down the brook, so that in a few years it extended down the brook more than a mile; its progress towards dry land was more slow, but has eventually spread over a number of acres, converting a bog meadow into the best of mowing. Mr. Bowen, who lived on the farm, informed me that he mowed it twice in the season, and that it produced about three tons to the acre, annually, of excellent hay, which the cattle consumed with as much avidity as any that was cut on the farm.

The meadow was so miry in many places, that cattle could not pass, but the grass roots formed such an impenetrable surface, that they could cart over it, in getting hay without difficulty; and, in some places, they entirely united across the brook, forming a natural bridge that a person might pass over. The brook is sufficiently large to operate a cotton factory which has been erected about a mile below.

I have taken considerable pains to ascertain the history, character and importance of the ribbon grass, and come to the conclusion, that it was originally an aquatic grass, and that the striped color was produced by being transplanted into a dry, gravelly soil. I have seen it in a number of places where it had been cultivated for ornament, spreading beyond its boundary and outrooting other grass: in these instances, if in the shade or on moist ground, it loses its striped color. In one instance, the roots passed under the garden wall into the back yard, and entirely eradicated the other grass, and occupied a number of rods of ground, when it grew rank and lost its striped color. I have not been able to ascertain the best mode of propagation; it produces little if any seed that will vegetate. The striped grass of the garden, I am confident, does not produce any; for we have cultivated it for near twenty years, and have never known a single spear that was produced from seed. The Phalaris that grows in wet land, blossoms abundantly, but produces very little seed, and that is liable to become fungus, resembling the spurred rye. The propagation by transplanting the roots into wet land among the bogs, although attended with but little labor, must take considerable time to entirely eradicate the bog grass, as I have proved by experiment. I transplanted, a number of years since, into a bog meadow, some of the grass, and although it took root and grew rapidly, spreading among the other grass, and even sending up shoots in the centre of bogs, still the bog grass remains. I planted, as an experiment, about one-half of an acre bog meadow with the Phalaris a year last spring, it having been previously ploughed for two or three years; it was planted four feet apart each way; it all lived, and is spreading well, and probably in a few years will occupy the whole ground. I have ploughed up one acre more, and intend to plant it in the same way. I also sowed some of the seed last spring, procured from grass that grew on wet land, but am not certain that any of it has come up. Shall sow more next spring, and hope in a few years to be able to ascertain its importance, and the best mode of cultivation.

Yours, with respect,

ANDREW HARRIS.

Hon. Elizur Goodrich, Jr.

From Kenrick's New American Orchardist, (2nd edn. 1835.)

CLIMATE.

The climate of the Atlantic States has been generally characterized as variable and inconstant. These sudden changes are caused in a great measure by the conflicting winds, which blow alternately from the opposite points—the sources of extreme heat and of excessive cold. Those especially from the southeast, and south, bring alternately, clouds charged with sultry vapors, or storms of rain, or the fiery particles and intense heat which they have inhaled in the equinoctial regions. While the winds from the northwest are not only dry, but coming over the enormous mountains, covered with ice and snow, and from the immense frozen territories which stretch towards the Arctic regions, and thence westward, and from the great icy ocean towards the pole, they imbibe at certain seasons, a degree of cold the most piercing and intense. These adverse winds bring by turns, and often by sudden changes, the heat of the tropical, or the extreme cold atmosphere of the polar regions.

The disastrous effects of these sudden changes from heat to cold during the spring, appear to be much more sensibly experienced in the states of the south, than in those of the north. For in the latter states, the frozen earth at its surface, is for the most part protected during winter, at the freezing point, by the usual covering of snow. Vegetation slumbers profoundly secure, immured in our winters so intensely cold, and so fortunately prolonged—nor awakes till the danger is past.

The climate of our country, in regard to its capacity and vegetable productions, is not to be estimated by the measure of its distance from the equator, nor by the average temperature of the *winter*, or even that of the *year*—but rather by the *mean heat of summer, and its duration*. For while the average temperature, or *heat of the year*, is greater at Rome, and at Marseilles, than at Cambridge, Mass. the *average heat of the summer months may be nearly equal*, since the *mean of the greatest heat* at Cambridge, exceeds that of Rome by 11°—and that of Marseilles by 8°—the mean of our greatest summer heat being 97°; though 100° and over, in some summers, is not with us uncommon.

From the average of the observations which have been made in 20 cities on the continent of Europe, the climate of America has been compared. And the proportion of rain which annually falls is two-fifths *greater* with us than with them, or as 50 inches to 30. Yet our rainy days are annually, from a fourth to a third *less* in number, than with them, or as 85 or 90 days of rain with us, to 122 days with them. The rain with us descending in profuse showers, and often in torrents, with tremendous lightning and thunder. While on the other hand, the number of our fair days, or days of sunshine, in the year, is double that of the 20 cities of Europe, or as 130 bright days with us, to 64 with them. In this respect our climate is doubly blessed, in our serene skies, and our more perpetual and brilliant sunshine.

The climate of a country is variously modified by its situation in regard to mountains and to the ocean. The temperature of the climate on our extensive Atlantic coast, differs considerably from those parts of Europe and of Africa, which lie in corresponding latitudes. In like manner, the climate of our country will be found continually varying, as we advance longitudinally, from its eastern to its western shores.

It has also been observed, that within the temperate zones, the *western coasts* of continents, and large islands, are found to possess a higher mean temperature than the *eastern coasts*. Our climate, on the shores of the Atlantic, must, therefore, correspond nearly with that of the eastern coasts of China, Japan, and Chinese Tartary, and the islands on its coast. And the climate of our country which bounds on the Pacific, may correspond nearly with that of Europe on the coasts of the Atlantic, in the corresponding latitudes.

Elevation above the level of the ocean, has the same effect in lowering the mean temperature, as an increase of latitude. Mons. de Candolle has ascertained, by experiments on some mountains in France, that the elevation of 180 or 200 yards, affects the mean temperature, in the same proportion as a degree of latitude to the north, on that same meridian; and in a similar proportion for any increase of height.

The growth of trees and plants, in rich moist soils, and in warm and protected situations, is not only unusually rapid, but is also prolonged to a very late period in autumn, or until suddenly arrested by frost; and the immature wood of a forced growth being tender, is the more liable to be killed by early frosts and by winter.

On the other hand, those trees and plants which grow on dry and stony or sandy soils, and on the open plains, and on the hills which are most of all exposed to cold winds, the wood completely matures in due season; and such trees are found to suffer least of all from early and destructive frosts, and from winter.

Delicate trees and plants, the natives of southern climes, become more hardy, and more capable of supporting the northern winters, by being planted on the north sides of buildings and in their shade. Their growth being thus modified, the exposure to the most intense degree of cold, in such situations, is more than compensated by the protection which is thus afforded to the plants during winter, from the pernicious, and far more destructive rays of the sun.

More delicate shrubs or plants, may be protected by being surrounded by a thin covering of straw. They may also be protected by a few inches of litter placed around their trunks, and over their roots. Moss from the meadows, or evergreen boughs, being more incorruptible, are to be preferred for delicate plants. For it has been lately announced, as an important fact, that the destruction of delicate plants which is sometimes occasioned by winter, is caused by the alternate freezing and thawing of the earth at its surface—that death commences at the surface, which this protection will prevent.

The finest fruits of the tropics, when cultivated in countries remote from the equator, lose their good quality and sweetness. In the climate of England, we are assured from undisputed testimony, that the finest peaches of America prove "*worthless.*" Even those which, confessedly, travellers with us, so much admire, with but two exceptions, prove good for nothing in their hostile climate, not coming to their full maturity and excellence, even on the walls to which their cultivation is confined. Fifty American kinds were contained in their garden, at Chiswick, at the time their account was written. [See Pom. Mag. No. 54. Also, Cat. Lon. Hor. Soc. for 1826.]

The *pavies* [cling-stone peaches] particularly, are there denounced, generally; while in warm countries they are preferred to all others.

Some of the finest apples of America, and of Italy, seem also in that country to have shared a like disastrous fate—and the *Pomone Finale*, or *Mela Carla*, which in the climate of Italy, is reputed to be the finest apple in the world, proves in open culture, in England, but an ordinary fruit, as their writers assure us.

The reverse of this is also true, and many fruits of the north will be found to depreciate, when cultivated in a warmer latitude. And the *White Moscow* or *Astracan*, which by the celebrated M. Christ, is described as a fruit so very extraordinary "*in a suitable situation and climate, which is not under* 49° *of polar elevation.*" This fruit is pronounced but at mediocrity at Paris, and with us proves an indifferent fruit. And many of the fruits, the natives of England, and of other northern countries, and of high reputation there, have proved but ordinary when brought down to our own latitudes, and compared with our own fruits, and those of climates equally favored with us.

The cherry tree, the pear, the apple, and many other kinds, when carried within the tropics, become unproductive or barren, or the fruit worthless.

The olive and the vine may indeed grow within the tropics; but we are assured they produce little or no fruit, except in the mountainous elevations.

The cereal varieties of grain, the annual plants and productions, those most necessary to the subsistence of man, have by him been acclimated from the borders in the tropics, to very high northern latitudes.

Man himself has become habituated to all climates. The horse, the most noble of animals, and the ox, the most useful, seem, under the guardianship of man, in some measure, alike constituted. The horse and his rider traverse the earth, from the burning deserts of Sahara, to the frozen regions of Siberia, and the boundaries of the Arctic circle.

Extracted from Kenrick's New American Orchardist, (2d edit. 1835.)

ACCOUNT OF THE CHINESE MULBERRY TREE (*Morus Multicaulis.*)

[We have at various times laid before our readers detached notices, of the properties and value of the Chinese mulberry, the culture of which, in connexion with raising silkworms, we are persuaded will hereafter be very important to a large portion of Virginia, and other southern states. Some of the most recent European discoveries we have been enabled first to offer (though translations) to the American public—and one of these new facts, (which is referred to in the following extract,) is all important to those who design to raise the new mulberry, viz. that this kind cannot be propagated by seeds, so as to preserve its peculiar character and value. The following extract from the recently published second edition of Mr. Kenrick's Orchardist, brings together much of what is known on this interesting subject.]

Of all the varieties of mulberries for silk, the Chinese mulberry or *Morus Multicaulis*, appears that which is most eminently entitled to preference. It originated in the elevated regions of China, a country famous from antiquity for its silk, and renowned for its industry; a parallel to our own in its climates and divers latitudes. It is to this tree, that the disciples of Confucius, acknowledge their indebtedness for the prosperity and solidity of their empire.

The *Morus Multicaulis*, or *Chinese mulberry*, since its introduction to France, seems destined to replace, every where, the common white mulberry, for the nourishment of silkworms, such is its decided superiority over all others. The tree is beautiful, and of a rapid growth. The leaves in a dry and arid soil are of less size, and elliptical, their breadth being six inches and their length eight; but in a light, friable, rich, and humid soil, they are large and cordate; extraordinary specimens having sometimes measured more than a foot in breadth, and fifteen inches in length; their upper surfaces are convex or curled, and of a deep and beautiful shining green. The fruit which was unknown even in France till 1830, is long, black, and of appearance sufficiently beautiful, its flavor good, being intermediate between that of the red, and that of the black mulberry; its produce is abundant.

This mulberry differs from all others in the property which the roots possess of throwing up numerous flexible stalks; the great length which these stalks acquire in a short space of time; and the facility with which it is propagated from layers, or even from cuttings; also from the remarkable size which the thin, soft, and tender leaves, speedily acquire, and the promptitude with which they are renewed.

The silk which the worms form, from the food afforded by this plant, is not only of superior quality, as has been abundantly proved in France, but the cocoons are of unusual size. The leaves from their extraordinary dimensions, being gathered with important economy of labor, and of time; and from their superior nutritious qualities, they are preferred by the insects to all others.

This mulberry should be cultivated in hedge rows, and never suffered to rise higher than seven or eight feet. But a few years are sufficient to raise considerable fields of them in full vigor, sufficient to support an immense number of silkworms; and regular plantations can be speedily formed, by planting the shrubs at the distance of from six to eight feet asunder; a space sufficient for the extension of the branches—sufficient also for cultivation, and for the greater convenience of gathering the leaves. So greatly is this last operation facilitated, by the flexibility of the stalks, and the very superior size of the leaf, that as we are assured by M. Perrottet, a child is sufficient for gathering the food for a large establishment of silkworms.

The introduction of this plant from Asia is due to M. Perrottet, Agricultural Botanist, and traveller of the Marine and Colonies of France. It was brought by him to France in 1821, in that vast collection, and variety of productions, which he had, during thirty-four months, procured in the seas of Asia, or gathered on the coast, or in the lands of Guiana.

From Manilla, the capitol of the Phillippine Islands, whither it had been brought by the Chinese as a tree of ornament, as well as of eminent usefulness, it was introduced by M. Perrottet into the Isle Bourbon, and from thence into Cayenne and France. At a later period it was sent from Cayenne to Martinique, and from France to Gaudaloupe; also to Senegal; the numerous plants which are already disseminated in the divers climates of Africa, of America and Europe, have all been produced by the two individual plants which were brought by M. Perrottet from Manilla. At first, its cultivation in France was confined almost exclusively to the royal gardens, that its trial and dissemination might be thus rendered the more effectual throughout every department of the country. The Morus Multicaulis, according to M. Perrottet, will be readily acclimated, inasmuch as it originated in a country analogous to that of France; it appeared neither to suffer from the excessive cold of the northern, or the intense heat of the intertropical regions, as the plants in the government gardens of Cayenne, had acquired during eight months a truly remarkable developement, being clothed at that time with leaves of extraordinary size; those also, which were cultivated in Senegal, although planted in an arid soil, and situated beneath a scorching sky, exhibited an appearance sufficiently satisfactory; yet in all respects, they had acquired less developement than those which were planted in the humid climate of Guiana.

M. Poiteau, in the Annales d'Horticulture, has stated down to 1830, "that by the information which we receive from all quarters, this mulberry is destined to replace the common white mulberry, every where, for nourishing silkworms." "This mulberry has not suffered in the least, from the rigors of the last severe winter."

At New York, on Long Island, this mulberry had endured unprotected the rigors of seven winters, and the very extraordinary winter of 1831-2 which destroyed so many trees hitherto deemed hardy, even to the root. Yet in our climate,* there are many kinds of trees which require protection during the first winter, though they may never need it afterwards. Such are the young seedling plants of but a single summer's growth, of the *cherry, plum, pear, the quince and white mulberry.* All which require to be taken up in autumn, and laid slanting in earth, their bodies being in part protected by soil. For all these species are liable to be killed occasionally to the root by the first winter, or to be utterly destroyed by being thrown out by frost; yet in the second winter it is far otherwise; their roots becoming strong, and firmly established, the well ripened wood of the second year, and the wood of two years' growth, becomes indestructible by any but extraordinary winters. The same precautionary measures should in northern climates, be taken with the young plants of this mulberry so valuable—the layers of but a single summer's growth, which are separated in autumn.

The vegetation of the Morus Multicaulis, particularly in a rich and humid soil and protected situation, is extremely rapid and luxuriant, and prolonged to a late period in autumn, or till the tender and yet vegetating tips of the twigs are checked by frost. These extreme ends will generally be lost, as they always are of the *common white mulberry*, when young.

Jonathan H. Cobb, Esq. of Dedham, author of the excellent "Manual on silk," has tried them for several years, and in a letter dated 1834, he confirms the latter remark, and adds "but that we shall be able to rear it here, is decided beyond a question." Mr. Joseph Breck a distinguished botanist of Lancaster, from very critical observation of 100 trees which were set out on the place of S. V. S. Wilder, Esq. in Bolton, late in the spring of 1833, in a cold, springy soil, and northern exposition—seems persuaded from an experience of one winter, 1833-4, and from careful observation, that they may be even hardier than the common white mulberry, as they appeared to suffer less than some hundreds of the latter of three or four years' growth which stood beside them. Of any extraordinary results from a win-

* New England.—Ed.

ter so unparalleled and unheard of as this last has been, throughout the country, time will soon decide; and how this mulberry and all other productions have fared from north to south. This mulberry braves the most rigorous winters of France, even to the extreme north as far as Havre. Of this important fact, we have been assured from the first rate sources; from MM. Perrottet, Bodin, Poiteau, also from M. Eyries of Havre, who has there cultivated them from their first introduction to that country.

The prediction of the late Dr. Pascalis in 1830 that, "*after the discovery of this plant, a doubt no longer exists, that two crops of silk may be produced in a single season;*" this prediction has since been accomplished—its truth fulfilled by experiment. The soil and cultivation—the habitations for the successive generations of insects being yet the same, all thus converted to *double* use—and the production of a *double* harvest—it will be obvious, that the actual profit thus augmented, must be manifold.

It appears from the deliberations of the French Royal Society of Horticulture, (as noted in the Farmers' Register) that the Chinese mulberry or Morus Multicaulis is not a distinct species, and that as a new and invaluable variety, it can only be preserved by multiplying it from grafts, layers, and cuttings; and that by these means exclusively, have the Chinese cultivators reared the tree from time immemorial. Seeds sown near Venice, have, it is stated, produced varieties, but none like the true Morus Multicaulis. I have myself examined about forty trees, raised in 1834 from seed sent from China, but they appeared to differ from the true kind. Their leaves were indeed handsome, but I saw none with the curled or convex leaf.

From Kenrick's New American Orchardist, (2nd edit. 1835.)

NUMEROUS SUCCESSIVE CROPS OF COCOONS.

From the present encouraging appearances, we are induced to believe, that instead of one single and solitary crop of silk in a year, we may yet be enabled, in our climate, and with our prolonged summers, to raise not merely two crops of silk a year, with a void interval of time between them, but numerous crops of different ages at the same time and in rapid succession for a season. With the complete establishment of such a system, a new era with us will commence. There are mulberries which will renew their foliage suddenly, and for numerous successive times in a season. Where a regular succession of crops can thus be obtained, with a diminished proportion of labor, of land, of cultivation, of habitations and of furniture, for the successive generations of insects, how greatly augmented must be the profit.

Some, I am aware, might object, on the supposition that the plan has been before tried an hundred times in Italy, in France, and other countries. Not a doubt exists but it has been tried. But we have no evidence whatever that in a suitable climate, it has ever been tried fairly and aright, and failed. It seems important, that in this case, only the eggs of the former year should be used, as these by age, are found to hatch more promptly and simultaneously, and all these may be saved from the cocoons of the first crop produced, which would prevent the possibility of a degeneracy. These are to be preserved dry at a suitable temperature, and to be transferred to an ice house if necessary, till the season they are wanted. Dr. Millington, however, is persuaded that it might be advantageous to have different races of different ages.

In Tuscany, so fine is their climate, that two crops of silk are annually produced. The same has been effected by Mrs. Parmentier at Brooklyn, on Long Island. The first crop being fed from the leaves of the *Morus Multicaulis*, *Morus alba*, and other mulberries promiscuously, were of different colors, some white, and some of an orange color. But a second crop of worms from the same cocoons, being fed exclusively on the leaves of the *Morus Multicaulis*, finished their labors in the short space of twenty-six days from the commencement, which was about the 30th of July. This last circumstance might be, in part, owing to the warmth of the season. The cocoons thus produced were not only of larger size than those of the first crop, but what is still more important, they were beautiful and shining, and of the *whiteness of snow*.

At the Fair of the American Institute of New York in 1833, cocoons were produced of two successive crops of silk. The first crop were hatched 11th of May. The second crop the 8th of July, and a third crop might have been produced. All being fed on the *Morus Multicaulis*, they were of a snowy whiteness. In the same year Mr. E. Stanley of Ogden, N. Y., produced two successive crops, the second were hatched by accident, and the cocoons were fine. In Brattleborough, Vt. in the same year two successive crops were produced from the common white mulberry. And in 1834, as Dr. Holmes has recorded, *two crops* of cocoons, both of them large and perfect, were produced in Winthrop, Maine. See his account in the *Maine Farmer*, vol. iii. Feb. 20, 1835, published at Winthrop.

In all these cases, the second crop of silkworms was produced from the eggs from the cocoons of the first crop.

Dr. Millington however, states that this practice is wrong. In his valuable communication in the American Farmer for January, 1829, he has stated that the eggs of the same year hatch but partially, or do not hatch so regular as those of the former year. He notes the date and the day the eggs are produced, on the papers on which they are deposited; and those eggs of a similar age are brought forward to hatch at the same time, and then they usually are all ready to spin together. These are carefully rolled up and preserved in dry boxes, and kept in a dry cool cellar, and in June or July of the following year, and when the heat of the climate or season requires it, they are transferred to a dry ice house.

Among the great advantages of having silkworms of different ages in the same apartment, Dr. Millington states, "that the same room and shelves will hold abundantly more worms at the same time, without being crowded; and a room and shelves which will but barely accommodate 100,000 full grown worms, will better accommodate 250,000 consisting of four or five different ages, provided each age or parcel are about equal in number, and are hatched at about seven or eight days apart. Another advantage is, the same number of hands, with the same quantity of labor, will make more silk and do it with less trouble and perplexity, than when the whole crop of worms are of the same age and all spin at the same time. When silkworms are young, they are extremely small, and require but little room, little food, and little attention. All the food they consume, up to the time they are sixteen days old, would not make more than one meal for them when full grown; consequently when the whole crop of worms are of the same age, there is at first but little to do; but for a few of the last days they will eat voraciously, and must all be removed and cleaned frequently, and all set to spinning at the same time. So much to do at the same time creates a hurry and perplexity which must eventuate in a loss for want of time to do all that is required. * * * When the worms are of different ages, the labor required is more equalized. A part of them will constantly be of the age to require considerable attention. But this parcel will be so small, that the hands will have spare time to attend to the younger parcels. I have certain shelves allotted to each parcel during a certain age; and *other shelves exclusively for them to spin on.* I begin with the fresh hatched worms, placed on the shelves allotted to worms of that age. After their first moulting I pass them to the shelf allotted to the next age, and again supply the first shelf with fresh hatched worms. In this manner I continue, through the whole season, to bring young worms on the first shelves, and pass them on until they reach the spinning shelves, from which the cocoons are removed, to make room for the next succeeding parcel."

"Last year I had silkworms constantly in feeding from the 20th of April until after the 20th of October."

We are assured on first rate authority, on that of Gideon B. Smith, Esq. of Baltimore, that Dr. Millington is an eminently practical, scientific agriculturist, and has made silk one of the principal objects of his attention during several years. Mr. Smith from his own experience, "bears testimony to all Dr. Millington's remarks. And considers his as the very best article which had yet appeared." This was in January, 1829. Dr. Millington resides at St. Charles, in Missouri, about latitude 38°.

I am perfectly aware, that the excellent Dr. Pascalis, at the time he published his work on silk at New York in 1829, endeavored to explode the idea of attempting to raise numerous crops, or even two successive crops of silk in a season. He states some plausible reasons for his objections, particularly the record of the failure of an attempt near Lyons about 1820—and also the failure of the attempts at the Isle of Bourbon, situated beneath a fiery sun, and within the burning zone. In the next year and in No. 2 of his valuable work, "The Silk Culturist" for January, 1830, Dr. Pascalis has recorded the successful introduction of the silk culture to the *north of France*, a thing which had been deemed at least, equally as problematical thirty years before. Also that Dr. Deslongchamps had even succeeded in raising a second crop of cocoons from the eggs of the first. Dr. Deslongchamps was one of a society of *savans* at Paris who had performed many experiments to prove that this branch of industry can be successfully carried on through all the northern departments of France. He also had ascertained by experiments at Paris, that the cocoons which were produced by silkworms fed exclusively on the *Morus Multicaulis*, were even rather heavier than other cocoons. The more complete and effectual conversion of Dr. Pascalis to the system, does not appear so fully until afterwards, when speaking of the *Morus Multicaulis* which he had received from France, he says, "after the discovery of this plant, a doubt no longer exists, that two crops of silk may be produced in a single season."

THE SUPERIOR ADVANTAGES IN WARM REGIONS TO BE DERIVED FROM FLOODING LANDS, BY DIVERTING THE WATERS OF RIVERS.

Translated for the Farmers' Register, fom the *Annales de l'Agriculture Francaise.*

[The following is part of a much longer article, on the great superiority possessed by the cultivators of southern regions, over the northern, in deriving benefit from irrigation. We have here only given the general statements and reasoning of the author, (M. Gasparin,) which seem undeniable, and which will serve the purpose of attracting attention to this subject, which is no less novel than important in the hilly region of the middle and southern states. We are the more willing thus to limit the space here given to this subject, because so many of our pages have recently been occupied by more practical details of irrigation, and more particular and accurate estimates of the cost and profits, in moist and northern countries. Whatever advantages are derived from this practice in the latter, are certainly very far less than are to be obtained in warm and dry countries. Upper Italy, one of the most productive parts of the globe, owes its superior agriculture entirely to irrigation—and even in Spain, one of the worst cultivated countries in Europe, this practice is pursued to great advantage, though almost no other improved or scientific practice is any where there, in use.

The flooding spoken of by the French author, is very different from the more perfect British methods of irrigation, described in our two last Nos. Instead of distributing, very equally, and using up a small supply of water, and saturating the soil with it, the general plan here spoken of, is to divert the courses of large streams, and at proper times to pass a flood of water rapidly over the neighboring sloping grounds, so as to imitate the natural process and effects of a very heavy rain, of short continuance. The artificial works for this purpose, on any one point of a river, would necessarily be on a large and expensive scale, and would require the concurrence of many proprietors, and even of legal permission and aid: but the operation is comparatively very simple, and would serve to benefit the farms of many different persons, and perhaps form many miles in extent, at a small cost for each.]

The great question regarding machinery is not completely settled by my former work; doubtless the application of mechanical means has exalted our species; the developement of this powerful principle tends to dissipate those dangerous collections which industry has brought together in our large cities; it will confine hands in the country. But machinery itself is going to take possession of the fields; the steam-plough will soon open the furrows ot England; the human intellect will borrow more and more from nature her powerful co-operation: the inheritors of labor will respond in the fields to this same cry ot fright that the work-shop utters, at the view of this unexpected disturbance, of these new means, which are coming every where to take the place of muscular strength; at first they will not understand, they will receive only with fear, the noble gift of intellect. Let us seek to prepare and to make comprehensible this great and salutary crisis; let us prevent, by an exposition of facts, and an explanation of their consequences, the shameful leagues of slavery and barbarism; let us smooth the way for the conquests of science; let us establish the true principles of independence based on the ennobling of humanity; and may the echo of our fields return only a cry of liberty.

But whatever may be the power of these machines; whatever may be the force which they conceal in their burning centres; with whatever unexpected effects they may strike our attention, they will not be able to surprise *us* who have long possessed and enjoyed the effects of an engine, simple, but greater, more prodigious than all that the force of steam united to the most powerful levers could ever produce; which rolls fertility and abundance into our plains; which, at once, increases ten-fold the value of our soil, and lavishes upon us riches without labor. It is the *inclined plane*.

What people better prepared for the prodigies of industry than the people of Vaucluse, who borrow from the Durance, from the Sorgues, and all their tributaries, so much wealth and repose. In vain might you demand from manufacture its most ingenious processes, and apply them to the cultivation of your fields; would you ever make any thing to equal our magnificent meadows? They are as a constant precept, a living lesson that it is not by his sweat, but by simple and rational combinations, that man establishes his empire. This admirable and simple machine, the effects of which we are about to describe, of which we invoke the influence, does not require, for its action, extended space or wealth. Small with the small, great with the great, it adapts itself to all, in every proportion: with its simple or powerful apparatus, it follows the levels traced out for it by intelligence.

It is on this magnificent amphitheatre which is displayed from the summits of Ventoux to the shores of the Rhone; in this country which possesses, on a limited space, from the alpine pasturages at a thousand fathoms above the sea to the lands which sink almost to its level; it is on this varied soil that, without passing beyond the mountains, we may study the instructions of Italy.

In traversing the department of Vaucluse, one is struck with two very distinct kinds of agricultural success: the first which is united to what I shall call the turbulent and bustling civilization of the north, with its energy, its tools, its labors, which swallow up every instant, overturns, breaks up, undermines the earth: the other, the noble inheritance of antiquity, which reposes upon the herbage, invokes the aid of the streams, directs them tranquilly over the soil, and awaits their immense results. It is this which we are now about to speak of, because it accords with our principles, because it is the civilization of happiness. It respects leisure; and a simple, but heroic means, it comes here to supplant those complicated arrangements which exhaust the human race.

At Orange, the fiftieth part of the territory is subjected to irrigation, and however small this extent may be, it becomes sufficiently important to form a striking feature of our agriculture. Meadows as beautiful as those of the Milanese, are mowed three or four times a year—and rent for 850 francs the *hectare;* about a third of this sum goes for the expense of cultivation. Such a product represents from thrice to ten times the revenue of soils identically similar under the ordinary culture; and when we reflect that such an advantage is obtained almost without labor, we should confess the superiority of this kind of cultivation.

At Avignons this trait of our southern agriculture is displayed on a greater scale. A canal from the Durance, the waters of the Sorgues, and the daily employment of these means, have extended irrigation over a greater circle. The water here also triples the value of the excellent lands which surround the city.

At Vaison, at Malaucene, irrigation raises the value of soils, naturally inferior, to 12 and 14,000 francs the hectare.

At Cavaillon, where such various productions are drawn from the soil; where the melon and the artichoke are cultivated on a grand scale; where corn, under irrigation, braves the greatest droughts, the water of the Durance has in certain places increased the value of the land ten-fold. Uncultivated tracts which were scarcely worth 500 francs the *hectare* are now worth 5000.

At Sorgues, a barren heath, which distressed the eyes of the traveller, irrigated by these same waters, has been centupled in price: smiling fields worthy of Lombardy have replaced the desert.

It is under feeble means, nevertheless, that these riches of the soil are developed; it is almost only at Cavaillon on the immediate borders of the Durance that they have acquired a remarkable developement: every where else they are trials, they are as an example bequeathed to our posterity, to show them what they can, and ought to do; they are traditions of antiquity, a recollection of Italy: they are some scattered shreds which defend themselves from the encroachments of the plough. Here, recourse is had to the waters of a fountain—there, they borrow from a torrent, which the heat of summer soon dries up. At two spots, feeble brooks confined by dams, form useful reservoirs, which constitute the prosperity of two villages.

At Caromb, and at the Tour d'Aigues, the hand of intelligent man has given a great example; it is a seed which will produce its fruits when the direction of agriculture shall cease to be confided to the isolated efforts of our husbandmen; when government shall comprehend their great mission, and know that they are the only *syndicship* of a population, scattered, without union, without means of action, and reduced to individuality.

This mission has been understood by men, who, without speaking of their lights, possessed them in reality. We have added some technical words to their vocabulary, but we are behind them in the exact knowledge of their country. The code of irrigation of Comtat and of the princes of Orange, the protection granted to every hydraulic enterprize, prove that in that time they comprehended, better than in our days, the springs of our prosperity: it is because then the impulse advanced from the south, from people who lived under its influence: the north did not yet weigh upon us—it had not proscribed our language and our nationality; our necessities were appreciated by those who shared them.

It was a bishop of Carpentras who caused the sluice of Caromb to be constructed. This a very small stream, the waters of which are slowly collected in winter: but at the voice of power and genius it has acquired the importance of a river. The lords of the Tour d'Aigues renewed this grand and noble example, in the neighborhood of Perthius. But where are the bishops—where the lords of our day? What patronage has replaced theirs? There is but one that can do it; this is the national association, to which we have entrusted all our means of action: it is the royalty and its government—the agricultural democracy, which protects it with its powerful egis, may also claim its canals and its basins of Lampy, and of St. Ferréol. The example of these reservoirs—of these artificial lakes, as I shall call them, is also an Italian conception; they are common in Piedmont—for it is only rarely that we can put under contribution the water of great rivers which occupy the bottoms of valleys; it is only by long and expensive works that their services can be borrowed; it is always from their tributaries that irrigation is demanded; it is not the Po, but the Adda, the Adige, and the Ticino that water Lombardy. Their current is more rapid; it comes more immediately from the mountains. So, except in some cases, it is not from the Rhone, notwithstanding its constant current and the acknowledged quality of its waters, that we shall demand our irrigations. It is from those torrents that rush from our alps with a rapidity ten times that of the Rhone. On their courses we shall find the elevated levels which can conduct the water over the exhausted *plateaus* of our plains; it is from them that our ordinary lands will demand the tribute of fertility. The Lez, the Eygues, the Louvèse, and on the other side of the Rhone, the Ardèche, the Cèse and the Gardon must supply all our necessities; but it is by a particular management, by imitating, on the sources of these rivers, the works executed on feeble brooks, that they can acquire a decisive importance.

The north-west of the department of Vaucluse possesses but few means of irrigation. Concentrated on the immediate borders of the Lez, near Bollene, and of the Meyne, near Orange, the higher waters of the Lez and the Eygues are retained in the upper part of the valleys. The commencement of a canal taken out of the Rhone, below the cataract of Viviers, has not fulfilled the hope to which it gave rise. Proceeding from the immediate banks of the river—that is to say, at the descending *(declive)* part of the valley, it is applicable only to the lowest grounds; nevertheless, the country might have derived great advantages from it, if interests had been combined. But the enterprize has been left to private resources; the canal has not had the necessary size, and has not been extended above the cataract.

In speaking of so much feebleness, is not this a proper occasion to invoke the national power—the influence of the departments—the budget of the *communes?* What! canals for navigation are dug at the expense of the state, for the benefit of a commerce, of which we know not how to enlarge the basis, which is the abundance of production. Basins above are constructed to feed these canals; the departments are taxed, or borrow money, to perfect their means of transportation; the *communes* find on their budgets, theatres, monasteries, churches, and twenty thousand *hectares*, which are worth fifty millions, and which, under irrigation, might be doubled in value, cannot awaken their attention! Yet this is the base on which will be established finer roads, more sumptuous theatres, and churches more richly ornamented; for it is the base of an immense revenue. Eight leagues of canals would complete this work; two millions would accomplish it magnificently.

An irrigation, to produce all its benefits, ought not to be excessive. It should equal a sufficient rain: beyond this proportion the water would stagnate, and do more harm than good. It is the surface of the ground which should be kept damp; this condition will suffice to prevent the evaporation of the inferior moisture of the soil. Now, two inches make a good rain, three, an abundant one; and this last is the limit at which we should fix, for our climate, the mean quantity to be given at each irrigation. Every calculation not agreeing with this, would prove, either that the lands are badly laid off, or that the inundation has been made with too feeble a stream. In fact, when the quantities arrive successively, they are absorbed by the inferior strata; they cannot extend themselves over the surface. If the land is very light they are swallowed up; but when the flow is sudden, then the surface is rapidly inundated. So, to allow about three inches, which is within the truth, is 1000 cubic *metres* per *hectare*. To go beyond this limit is a proof that the current employed is disproportioned to the extent and the quality of the land. Thus, all the art of irrigating is, to throw, suddenly, and in great quantity, the water destined to complete the irrigation. A stream of water half the size of another will not irrigate, in a given time, half an equal quantity of land; but only a fourth, and still less, where the natural current is insufficient Where the aid of irrigation is procured by weak machines, basins should receive the mass of the liquid and distribute it instantaneously to the land.

According to these calculations we should require at this point of the Rhone 200,000,000 cubic metres of water, allowing 1000 metres per hectare at each irrigation, ten irrigations a year, and 20,000 hectares of land. In Italy, the value of the water necessary for the irrigation of a hectare, is from 40 to 50 francs, at its issue from the canals, and this in spite of the competition of an extended system. The value of the water of our canal would rise then, annually, to a million. To allow this wealth to flow longer to the sea, is an unpardonable neglect.

We plough too much in France. We recur too much to the strength of our arms. We must be made to understand that there are other powerful means to call forth and to create richness; and that moisture, and natural meliorations are the auxiliaries of the arms. Cultivation excites, but does not create fertility, and ends by exhausing it: and when the proportions which constitute fruitfulness are broken, we find ourselves engaged in a calamitous career from which it is difficult to be extricated. For this reason we ought to have recourse, as soon as possible, to those irrigations which will spread upon the soil the masses of *detritus* [or washings] which are annually lost in the sea, and to profit by the increase of resources which will arise spontaneously from such an operation to establish meadows, which, in their turn, will deposite on the soil the powerful tribute of manures. Thus by irrigation, above all, we may free ourselves from the dangerous situation in which we are placed.

But however interesting may be the results to be obtained from a canal on the Rhone, it can never, as before remarked, be applied to, except for the low grounds, the margin of the river, already, almost every where, of an excessive fertility. The great object of irrigation ought to be, to fertilize, to enrich, to create the elevated, dry, stony soils, which form so considerable a part of our country, and which can expect productiveness only from irrigation and *colmatage*. It is then to other streams that we must address ourselves.

The Eygues has a course of 15 leagues, and its sources are as elevated as those of the Rhone, which has 150. Then one league of canal taken from the Eygues will give the same level as 10 from the Rhone. But the Eygues is only a torrent which scarcely suffices for the upper valleys. It fails at need; but sometimes it also rolls in its large bed frightful masses of water: the torrent becomes a river. We have seen feeble brooks from lakes. It is an inland sea which we require of the Eygues. Many *communes*, the Bois de Velage, the Plan de Dieu, the barrens of Orange, offer more than 15,000 hectares which implore its aid. It would require the disposal of 150,000,000, supposing that the ordinary stream and the current rains of the year could fill the reservoirs three times in the season of irrigation. One or more basins cubing 50,000,000 metres would be requisite on this stream.

A lake evidently had its issue at the strait of Piles in former ages. The scythe of time, or a deplorable speculation, has broken the sluice, and history does not tell us if the consuls were roused by it, or if Cicero defended the rights of outraged nature. Yet, notwithstanding the advantage of this indicated position, a new dam could not be established there. The valley above is cultivated. But from Sahurre to Saint May the country contracts, wild and uncultivated, the deep defile offers occasionally only narrow passages. It is 12,000 metres long, with a mean breadth of 400—a depth of 5 metres would give us just 24,000,000 metres. Higher up, on the same waters of the Eygues a natural lake was lately formed by the crumbling of a mountain; 72 toises of dam would produce it again. The tributary of the Oulle runs through valleys, wilder, deeper, more dammed up. In these, basins equal to the former might be found. Thus we have more than is necessary to pay to the plain the tribute it expects.

But irrigation is not the only advantage to be derived from these works. This damming up of the waters would be a means of conveyance in a country without communication, where all transportation is dangerous. These reservoirs, ready to receive the waters of storms, would moderate the sudden inundations which threaten the lower country. The perpendicular fall of the cataracts would diminish their impetuosity—fish would reappear in these waters unpeopled by the failure of the stream. On the borders of the lakes, moistened by the constant filtration and evaporation, would rise forests that would arrest the crumbling of the hills, and prevent the filling up of the beds of the stream. Finally, these fruitful valleys, embellished by the most unexpected objects, would be covered with charming seats, whither, as on the lakes of Italy, the citizens of the plains would come to support the heats of summer, and breathe a pure air. With their capital and the taste for preservation and creation which is the companion of competence, would arise the only possible culture in these abandoned districts: woods would reappear on the sides of the mountains, and thus would be commenced under every form, the work of re-construction, which it is our desire to inculcate.

But commerce will soon demand of you the works which I claim for agriculture. Every where interior navigation is arrested—the rivers are obstructed. In vain would you re-commence on their courses the labors of Ixion—your forces are powerless to remove the constant deposites which are formed in every season, day and night, at every hour. You must attack the beginning of the evil, and this evil is in the upper valleys. You must prevent the invasion, and you will not have to combat it. You will have no rivers till you have lakes. These make powerful rivers, and regulate their streams; and the Seine under this system would cease to be the sewer of a province—would become the most noble ornament of the capital, and our national monuments would be reflected in the crystal of its waves. Thus commerce and agriculture have here, as every where, the same interests.

The commencements should be made on the Eygues, because an interesting and varied country lies at its feet, and we should obtain immediately a number of comparative experiments on different soils.

The banks of the Louvèse are cultivated quite to its source, but the Toulourenc, its chief tributary, offers a narrow defile, confined by immense perpendicular rocks. Ten toises of works would form a considerable reservoir. Causans, Violes, and Courthezon would thereby obtain a more regular and extensive irrigation. Happily for the districts below, the Sorgues meets the Louvèse and contributes the aid of its inexhaustible waters; but I believe that it would be better to establish the works on the Eygues, and a canal of a league below Cayranne would unite the waters of the two rivers, and satisfy all demands.

But we can speak of irrigation in the south of France without thinking of the country which occupies the lower part of our basin, of that country which fixes the attention of agriculturists, the Delta of the Rhone? Like the Delta of the Nile, it cannot realize all the advantages of its position except by a vast system of irrigation. Salt is crystallized there by the rays of the sun, and proscribes useful vegetation; but as soon as fresh water touches this soil, the most vigorous fertility hastens to display itself. Nor have schemes for its improvement been wanting: some, and with reason, have invoked the steam engine; others have seen only the Rhone which rolls its immense mass of riches at their feet, but it is necessary to seek for elevated levels, and these are distant. In the small rivers, which rush more immediately from the mountains, might be found available upper levels; and whilst we should be obliged, on the Rhone to seek them at Viviers, and to overcome all the obstacles of a * * country, the Gardon, at 17 miles from the head of the Camargue offers a sufficient height to conduct its waters over the country. We must imitate the examples already given, and collect in winter in the depths of the valleys those waters which are to refresh the heats of summer.

The Gardon might form three great basins of irrigation, two above in the uncultivated valleys which it traverses in the Lozère, at the Gardon d'Alais and d'Anduze, and a third below, placed as a regulator, between the bridges of Saint Nicholas and of Colias: the length of this last valley confined within perpendicular rocks is more than 12,000 metres in a right line, but as its direction is very tortuous, and the river there follows a series of windings, many of which are at right angles, its actual length may reach 20,000 metres: estimating its mean breadth at 400 metres, and allowing a depth of 5 metres, we should have the mass of 40,000,000 cubic metres of water contained in this single basin; and supposing besides that it might be filled three times during the continuance of the irrigations, we might, on this one point, dispose of 120,000,000 cubic metres of water. The upper basins would, together, easily present the same results. We should have then at our disposal 240,000,000 cubic metres of water. This irrigation then, according to our calculations, might be extended to 24,000 hectares of land.

The Camargue is about 30,000 metres long, with a mean breadth of 15,000: it contains then 45,000 hectares, from which if we take off the immense pond of Valcarès, and the marshes, which in their actual state give a product which it is not desirable to alter, we see that the mass of liquid contained in the reservoirs will answer all necessary purposes.

This water would have a selling value of more than a million, but this value would be tripled in the profits of the proprietors who should use it on their lands: thus, then there are three millions of revenue which the Camargue may demand from the Gardon. This is the future promised to those who shall have to make three principal dams, some works (diaphragmes de sûreté) for the safety of the lower districts, six leagues of canals, and an aqueduct bridge over the small branch of the Rhone.

This would have been the proper commencement, if it had been seriously contemplated to rear a breed of horses in this isle, and to find here those military resources which have been so long sought: an abundant nourishment would have created a strong and numerous stock. In the Camargue might have been found those active horses which constitute the superiority of the Numidian race. I join in favor of my system this consideration to those which will be urged in my writings: arguments should be adapted to every mind, and he who would not dare to reconstruct Egypt, and to seek his examples so high and so far off, may wish, like Austria, to have his Buckowine, for remounting his cavalry on a limited space; to be able, for this reason, to impress on the individuals a more regular and more nervous character, and to profit by a singular combination of soil and climate to cause the Arab to bound over our territories; where may be found at once the immensity of the Desert, the Egypt of the Delta, and Arabia Petræa.

By extending the works on the Gardon, (and the margin is immense on the upper valleys,) Nismes, which sighs for water, disinherited of the works of the Romans, might, by constructions, worthy of its founders, worthy of that municipal wisdom which distinguishes its administration, have recourse to the same sources; the verdure from waters poured into lakes would adorn its industry.

But there is a river which we could not pass in silence without leaving incomplete the plan which we have traced out for ourselves. The Ardèche is loaded in its course with the most precious deposites. It flows over volcanoes: pumice stone floats upon its waters, and potash is dissolved in them: but scarcely freed from its narrow bed of rocks, it is precipitated into the Rhone, bathing some islands fertilized by its incomparable alluvions. On its course, the developement of basins would be immense, it is necessary to seek the employment of its water. But it has a great part to play: it may pass over the Rhone—an aqueduct bridge can place it next to the Pont-St. Esprit, and to mingle its waters in the plains of Vaucluse with those of the Rhone and its tributaries, of which we have already described the power. It is from the simultaneous aid of so many elements that we shall acquire, better than from irrigation, the varied alluvions which will create the most perfect of soils. The sand of the Rhone, the calcareous clays of our alps of Dauphiny, the volcanic matters of the Ardèche will unite to effect miracles of vegetation. Thus, blind chance, will no longer dispose of the theatre of our agricultural industry—we shall call upon the soil all the combinations advantageous to its cultivation, at our voice, the weak or the strong, the stiff or the light, obedient to the inspirations of genius, their forms and qualities will be modified under our hands. We shall establish our empire no longer over a vain extent of surface, but over docile elements ready to receive a body and a life. No longer with the sweat of the brow, and the cracking of whips, the sand and the marl will come to be united on the fields—but by the simple current of the brooks, with the murmur of the cascade, under a cool atmosphere, in the shade of the greenest foliages, in the view of an exalted nature, of a regenerated land, which will come to attest that a new era has commenced; that man henceforth is associated with creation—that he is no longer an exile living in proscription, axe in hand, but the lawful heir, and that the hour of redemption has struck.

I can here only indicate, without describing the works; so many elevated considerations rush into my mind, in the perspective of a possible futurity of which the results overpower me, that I cannot find a moment to devote myself to those considerations of description which ought to precede them. It would be a great and useful task to fix upon and describe the places, to give the levels, to ascertain the dimensions of the basins, and point out the means of construction: but at present it would become fatiguing to follow the course of our torrents, to remount, step by step, the valley of the Rhone in all its extent. Every where the same necessities are presented—every where a burning sun darts its rays—every where a lofty river rises from the summits of our mountains and wastes the soil—and every where the earth implores the succor of the water. In no place has the primitive integrity of the country been preserved: all those tributaries which rush from the mountains roll their waves under the same conditions. Rapid at their sources, they relax in their course, and are joined to the ancient bed of a lake whose dam has been broken down, whence they dash again in falls and rapids to reach their point of confluence with the river. A uniform law rules their destinies. The same circumstances are met with every where at the Roubion, the Drôme, the Vela; they must be studied and made to concur in the primitive reconstruction; this is the great task imposed on modern civilization if it wishes to advance in the progressive steps of comfort.

To feel all the importance of the works we have intimated, we must be convinced of one great principle: this is, that the productions of the soil are the surest source of the wealth of nations; and that these productions are never more abundant than when the moisture of a country bears a just proportion to its heat, so that moisture by heat is equal to vegetation. These two agents then, and their exact proportions, ought to guide rational agriculture in its operations, and the labors which should go beyond the balance of these forces would be unfruitful toils, and would produce only imperfect results like those on which the energy of man is now vainly lavished.

Where heat is wanting the task becomes difficult. We are thrown into the system of shelters, hot-beds and green-houses: we become gardeners. But where moisture only is deficient to the soil, an immense career is opened to the cultivator. Water is there superior to all combinations. This then, is the great principle; with the more energy these two elements united display themselves, the more exact will be the proportion of their forces, and the more completely will the vegetable kingdom be developed.

Under the tropics, deluged with rain, and burning with the beams of day, plants succeed each other without interruption, and give the maximum of vegetable richness: near the poles, or on the alps, a weak and short turf, with some plants in miniature, mark the last step of the ladder. Between these two extremes, all countries rationally managed, ought to range themselves in the order of their fertility and power, according to their latitude; but when the proportion is broken; when one of the conditions of prosperity has failed, it is in vain that the labor of man appeals to a condemned soil. Heat without moisture, makes a desert—moisture in excess, a marsh: disinherited lands, countries where the human race seeks in vain to establish itself, or where it struggles incessantly against nakedness and disease.

England, Belgium, the north of France, seem placed in that position where the natural equilibrium is established—where the climate dispenses moisture and heat in an exact proportion. It is this circumstance which has placed these countries at the head of modern civilization, a developement which owes nothing to intelligence—a fortuitous creation, into which man has entered but by the concurrence of his physical strength, but which has, nevertheless, placed those countries in advance of the southern nations, which have not sought to balance their means. But yet a moderate heat, a moderate moisture will have unfolded only a middling position, on the day when the south shall assert its advantages; for, where the heat is excessive, where means wisely prepared can proportion, on a large scale, the two principal agents of vegetation, there a superior developement may be expected.

I have seen vexation painted on the faces of Englishmen on beholding our rich meadows. The islander in his calculating mind, reckoned up in silence these brilliant productions; he made a bitter reflection on his northern temperature; he saw with a practised eye the state of the question; he estimated the power that would one day spring from this disposition of soil and climate.

But if the north enjoys these advantages naturally—if the seasons prepare for it all the amount of wealth of which it can dispose—if it owes to the exact proportion of the constituent elements of production its actual superiority—the south can look for its entire developement only from peculiar labors which the circumstances of its latitude render indispensable. Two of moisture, multiplied by two of heat, make four; but four of moisture, multiplied by four of heat, make sixteen. The first is the north, the other the south, when it shall have accomplished its task. Yet, this south is vast; the line which circumscribes it is not yet well traced out; it oscillates within large limits, and Poland languishes this year, like a desert in Africa: the cattle are dying there on the withered herbage.

An Englishman once came to consult me about an estate which he had in Cornwall, the warmest exposure in England: he wished to have grapes. My answer was this: make shelters, blacken the soil and the walls of your terraces, carry out dark colored stones; but if I could have said to him, you have a reservoir of heat, open a flood-gate of fire which will temper your frozen climate, with what joy would he have returned to his country! With what zeal would he have set about the work! And we, with our pressing necessities, under our brazen sky, on our petrified soil; we, who have only to stoop and take what providence has spread every where, we indolently use some threads of water bequeathed by Italian civilization. We stupidly try a plough, or an English course of tillage: we waste ourselves in puerile trifles—we exert an immense energy to run like madmen in a ruinous circle of labors and insufficient productions, and yet we know where the treasures are concealed—where are the arms to come out victorious from this strife of slaves.

In surveying the astonishing changes effected in the value of the soil by a process so simple as irrigation—in seeing this meansso to speak, put within reach of all, and so foolishly despised, we are tempted to demand where is this human intellect of which we are so proud—where is this civilization of which we always believe to have reached the limit? The intellect is lost in vain combinations—it has known neither how to foresee, nor to prepare the future; the civilization must be reorganized, for it has been bequeathed to us by barbarians; it pursues wealth which a false system cannot produce. The labors of which Egypt still bears the impress, those of which we meet with the traces in Persia, and which announce a vast system of irrigation,tell us that a great power was formerly established upon the creating principle we invoke: and the ruin of cities, and the misery of nations, which wander dispersed over canals filled up or broken down, tell us also that this principle alone had invigorated so much force. This principle, derived from the borders of the sacred rivers, from the gardens of creation, from Druidical veneration, from the woods—what say I? From all that ancient wisdom had accumulated of conservative ideas to defend the nobleness of the world from the assaults of barbarism, trampled upon now by organised brute force, has left only those vestiges which are the lessons of nations, and which, in huge characters, unfold the future. All ancient prosperity, all southern civilization, which have acquired any solidity, repose upon this rich system of irrigation; in Egypt, as in Persia, as among the Romans, who consecrated so many cares to hydraulic labors, and among whom, as we have seen, their greatest orators and statesmen pleaded for the dew of heaven, and the moisture of the fields.

It was the recollection of antiquity, it was the middle age, the depository of its traditions, which placed upon our soil this germ which I now wish to develope. What stopped its progress was that a new civilization, springing in its turn from the shores of the Baltic, entirely founded on force, hoping nothing from the ingratitude of the soil, but confiding in the energy of man, came to crush the ancient civilization, and that the customs of the north have finally prevailed and stamped their character on the rest of Europe. This influence has been fatal to the south—it has led it astray in the labyrinth of modern industry and artificial processes, to make it abandon the vast, calm, and fruitful system bequeathed to it by the east.

Thus may be explained, the resistance and repugnance of our husbandmen to adopt the foreign plans which modern theories would propose to them. A vague traditional sentiment recalls to them their fallen nobility: they know that they belong to a civilization different from that which has been imposed upon them; the pride of the Gascon has no other origin. It is in vain to propose to our peasantry, the most perfect rotations, aided by the best implements: they know that they might have better than that; and when in their wishes, until now powerless, our governors have allowed a glimpse of the possibility of a canal of irrigation, when preparatory works of leveling have been ordered, how the popular sympathies have crowded around the fertilizing idea! It is because, although the irriguous cultivation exists only in patches, although it has as yet employed only feeble means, yet enough has been done to show the superiority of this system over every other. From this we obtain a steady moisture proportioned to every climate—manures without care—combination of soils without expense—productions without labor—the *heart* and clearness of the land without tools—wealth and repose—material life and intelligent life—springing from the same source, and coming to take the just proportions which they ought to have in every well ordered social body.

There is no culture which does not derive advantages from irrigation; all, in different degrees, claim its aid. Watered trees take a rapid growth. It is on the moist lands of our islands of the Rhone, on the banks of the Durance, at the bottom of the valleys of the Cevennes, and on the borders of the brooks, that the mulberry acquires those prodigious dimensions which raise its product to 15 and 20 quintals of leaves. The trees, in this position, do not undergo that waste of sap which, in the heats of summer, arrests their vegetation, and makes them languish; their growth is the more rapid, as a constant moisture is combined with a more excessive heat.

But it is in the productions of meadows that the relative forces of climates are manifested. It is in their cultivation that the south can assert all its advantages. Grain in the south, as in the north, ripens under certain conditions of heat, which, once accomplished, produce maturity a little sooner or a little later, according to the latitude; yet this does not occasion a great difference in the actual product. But in a continued vegetation, as that of meadows, the grass grows as long as the heat continues and moisture accompanies it. Thus are obtained, in proportion to the climate, a number of mowings, which determine exactly the power of each country. These advantages are the results of irrigation, which equalizes these agents, when a regular moisture, induced by the intelligence of man, constantly joins its effects to those of heat. The seasons may be irregular and unsuitable even in the best balanced climates, but the reservoirs of fertility placed in the skilful hands of man will proportion the help to the need. With us the regular element is heat: this is ascertained from the fixed times of our harvest; but it is beyond our power. The irregular element is rain, which varies as from one to three, but it is for this uncertain element that we are able to substitute the certainty of our action.

I think I have left no doubts on the effects of irrigation. It triples our means—it increases them ten-fold, a hundred-fold, according to circumstances. To extend it over the whole surface of our plains, of our valleys, of our elevated table-lands, would be to introduce into the country an abundance till then unknown: it would be to change radically the basis of our existence, the nature of our labors, our social relations. Let us seek to lift the veil which covers this future: let us dare to sound the depth of the problem, and demonstrate that in it only reside those blessings which we seek by other means, equality, liberty, peace and physical redemption.

From the Southern Agriculturist.

ON THE USE OF PISE IN CONSTRUCTING HOUSES AND FENCES.

Columbia, (S. C.) Sept. 1st, 1835.

Dear Sir—You will see by the resolution, a copy of which you will find here below, that you are requested to publish the accompanying "Address to the Standing Committee of the South Carolina Society for the advancement of Learning and the Diffusion of Knowledge."

N. HERBEMONT.

At a meeting of the Standing Committee of Twelve, held on the 31st of August, 1835, the following Resolution was passed.

Resolved—That the Memoir on Pisé work be transmitted to the Editor of the *Southern Agriculturist*, with the request that he print it in his journal; and the Editor of the *Telescope* be requested to reprint it from the same.

To the Standing Committee of the South Carolina Society for the Advancement of Learning and the Diffusion of Knowledge.

Gentlemen—The great zeal exhibited at the last meeting of our society augurs well for its ultimate success in the furtherance of its objects, and the readiness with which gentlemen are subscribing for a fund for the purpose of erecting a suitable building for the accommodation of the society, is a sure guarantee of the determination to persevere in so laudable an establishment. It has for its object the advancement of learning and of useful knowledge, based on the best established scientific principles. It would be vain to attempt to show the great benefits which our country is likely to derive from a zealous pursuit of the objects in view. These must be incalculable, and we shall not be disappointed, let our expectations be ever so great: so that they are only within the bounds of practicability, if any thing approaching to the ardor now witnessed be persevered in.

As it seems that the first and principal object desired to be effected, is the erection of a suitable building for the accommodation of the society, I beg leave to be permitted to make a few observations that will tend to render this, our first act, as eminently useful as its nature admits. So far as it is possible, every step of such a society should be attended by a benefit rendered to the public. We expect, of course, that a building for such a society will be constructed according to the best models of architecture within our reach, and to join to the suitable convenience of its object, a specimen of pure and classical taste. Economy is one of the great requisites of great usefulness; for without it, it could not serve as a model and a lesson to the private citizen which he could prudently follow. I conceive it the duty of such a society, as this, not only to lead the taste and fashion in all that is elegant and useful; but also in the most economical methods of attaining these valuable objects.

There is a mode of constructing houses of various sorts, and also walls of enclosure practiced in various parts of Europe, particularly the southern parts of it, and also in South America, which, if it were exhibited to our citizens for their imitation, would most probably be attended with the most extended benefits, both in town and country. This, in parts of the country where rail timber is either scarce or of bad quality, would supersede our rude, inefficient and insecure common rail fence, by a substance durable, cheap, and found, with very few exceptions, every where, where a fence or a house may be wanted. This substance is *earth* neither too clayey or too sandy, beaten down by a rammer between two planks till it is of a sufficient degree of hardness, which it very readily acquires. This mode of construction is called ***Pisé***. There is not, perhaps, in the world, a place more favorably circumstanced for this kind of work than our town of Columbia. The red earth which is found here every where after digging a foot, or even less, is the best possible for it. Any kind of earth, however, will do, so that it be not a pure clay or a pure sand, and that it contains no vegetable or other putrescent substance. The usual test for it, is to take a handful and press it, and if it sticks together retaining the impression of the fingers, it is good. It is better to have much more sand than clay; for clay renders it liable to crack in drying. It may be full of gravel, pebbles, or small fragments of stone. It requires no addition of any thing, even water, nor any other preparation than the digging of it, and the carrying it where wanted. I beg, gentlemen, you will not mistake this Pisé with what is called "mud houses or walls." No, it is very different and very superior, yielding only in strength and durability to the very best work of stone or brick, done with the best skill and the best lime-mortar.

This mode of building is not a new, untried thing, the practicability and benefits of which may be fermenting in the brains of some visionary man. No, it has been transmitted from generation to generation, from the time of the Romans, into the principal parts of the southern provinces of France, and also in Spain; from which last country it has been transported and rendered most extensively useful in South America. It is the subject of a very full article, in a work of great authority, the "*Cours Complet d'Agriculture*," by the Abbé Rosier, assisted by some of the most scientific men in Europe. I have seen, in the vicinity of Lyons, houses and churches which are said to be between two and three hundred years old, which had been contructed of Pisé. Indeed, many of the richest inhabitants of that city have their country houses, palaces we might almost call them, erected with Pisé. You can also, any of you, gentlemen, have an ocular demonstration of the practicability of the thing, by riding with me to my place in our sand-hills, where I put up very hastily and unskilfully about four years ago, a small building, sufficient, however, to show the capabilities of this mode of building.

I do not propose that the principal edifice for the accommodation of the society be constructed in Pisé work; for, although I believe that it is capable of forming structures equal in beauty and durability with the materials usually used here, we have not yet workmen sufficiently skilful and experienced for such a purpose. I only intend to recommend the erection of out buildings and walls of enclosure for the present. These being erected in a conspicuous place, such as you will undoubtedly select, will be models for imitation from which the public will derive incalculable benefits.

Such are the facilities offered by this mode of construction, for fencing-walls, in Columbia, for instance, that the materials can be taken from the street to make an enclosure about six feet high, and thereby improve the street by giving it the usual form of being raised in the middle, forming drains on each side for the flowing off of rain water, &c. This thing must necessarily be economical and cheap; for the materials are usually found on the spot, requiring no hauling, and so easily executed that common laborers, under the superintendance of a tolerably intelligent man, are equal to it. The only expense attached to it is a thick wash of sand and lime put on the wall with a broom, (and my experience shows that this operation may be delayed for years without injury) and a coping of suitable materials. Stone is, of course, the best, tiles and bricks next, and wood. Poor people use turf, others straw, cut of a proper length, laid across the wall on the top, and kept down by earth. This has the double disadvantage of not looking so well and of requiring to be renewed every five or six years; although this is sometimes neglected for ten or twenty years, with no improvement in beauty, certainly; but without as great a change as could be expected from such culpable neglect. I have read an account of a wall several miles in length, in South America. which had been without a coping for more than sixty years, and yet it was standing and available. A wall of this kind carefully constructed, rusticated with the lime and sand wash, with a coping of durable materials, will stand pretty nearly as long as the earth on which it is erected, and of which it is really a part. As it has been used without any admixture, it must necessarily be incorruptible.

The question of the cost of such a work is worthy of inquiry; but it cannot be as expensive as a tolerably good looking wooden fence, which will not last twenty years, after having been continually repaired for the last half of that time.

Six workmen (negroes) is the best number for a set to work together, (and several sets may be under the same superintendant) can construct in one day three square toises of Pisé, that is, a wall six feet high and eighteen feet long; seventy-five cents per day, as the cost of each hand, is a very full allowance, as some of them, the carriers, may be inferior. This makes the expense of such a wall, independent of the wash and coping, $4.50 per day. This requires then about ninety-two such day's work to enclose a square of four acres which make $414, which is less than a good post and plank fence can be erected for. The cost, as specified here, is in reality much more than it would be in most cases; for this is reckoned at the price it would cost by paying the hire of the hands: wheras such work would be usually done by the plantation hands. If it be, however, desired to make a comparison between a fence of this kind and one of any other sort, the labor of the hands must be valued at the same price for the common worm, or post and rail fence, not forgetting the hauling; but, for any timber fence of a superior grade, the cost should be estimated by the price of carpenter's work, besides the cost of materials.

For a house, the foundation should be laid in stone or brick, in order chiefly to intercept the moisture arising by capillary attraction or otherwise, which might injure the building. The structure, in Pisé, commences then about one foot above the surface of the ground, and may be continued as high as with brick, with perfect safety, and the materials for it are taken on the very spot by digging a cellar. If the house is a mere outbuilding, such as a kitchen, stable, servant's house, &c., it is usually rusticated, as was said of the wall; but, if intended for a large and handsome house, it is rough cast, and any ornament may then be added to it. The pounding of the earth to form these walls, &c. so incorporates the whole into one mass, that, if the work has been well done, it may be said that the building is of one solid piece, and is undoubtedly more strong, firm and permanent than a brick house, unless the bricks are of a very good quality, and very carefully laid in the best lime-mortar.

There is much land of great value in the neighborhood of towns, the culture of which is sometimes abandoned on account of the scarcity of timber and its short duration, which renders fencing in such situations very expensive. All such might be enclosed with a Pisé wall at a comparatively small cost, and would make it worth while to make in the soil of such enclosed land, such improvement as would render it of permanent fertility, for which a large town always furnishes abundant materials.

The above is respectfully presented to the Society, with the desire that the subject may be treated with the attention which it deserves, and with the assurance that the writer is perfectly satisfied of the great and incalculable benefits that must necessarily arise from the adoption of this mode of constructing houses and fencing, wherever it is practicable, and that it is so, probably, in a majority of places.

I neglected to observe in the proper place, that the amount of work estimated as the usual day's work of a set of six hands, is for the building of houses, the walls of which are usually nearly double the thickness necessary for a fence, and that, therefore, such a set of hands can most probably make a great deal more of the very plain work required for a comparatively thin wall. I leave, however, this estimate as it is, so as to have it at the highest cost possible or probable.

Respectfully submitted by

N. HERBEMONT,
Chairman of the Committee on Rural Subjects.

From the Horticultural Register.

KEEPING CABBAGES IN WINTER.

The principal gardener in the Shaker establishment in New Lebanon, Columbia Co., New York, directs not to pull up cabbages in autumn "till there is danger of their being too fast in the ground to be got up. If there happens an early snow it will not injure them. When they are removed from the garden, they should be set out again in the bottom of a cellar. If the cellar is pretty cool, it will be the better."

From the American Gardener's Magazine.

ON THE CULTIVATION OF THE TULIP.

The season for planting bulbs being at hand, and presuming that some remarks would not at this time be unappropriate, particularly in regard to the flowering of the tulip, I with pleasure send you the following, which will be, perhaps, of some interest to your readers, and extend the cultivation of this favorite flower.

To attempt to describe this lovely genus, would, I humbly conceive, be an insult to the common sense of any community. The beauty of the tulip flower draws the attention of the most careless observers, and as it were, makes itself known to them at once, because it is one of those kind of flowers, when taken notice of, is rarely or ever forgotten. The Dutch are famed through the civilized world, for their splendid collections; inasmuch as some of their private ones have been valued at some thousands of pounds sterling. In England I have had the care of tulip bulbs, that were valued from *five shillings* to *five pounds sterling*, a *single bulb;* this is, perhaps, one reason why we so seldom meet with a choice collection in this country; the first cost being so great, and the time it necessarily takes, to give them proper attention, is another considerable item with those who have business to attend to, and who have but a small portion of time to spare, in the care and production of elegant flowers. Nevertheless, there are persons in every city who can afford to spend both time and money in such pursuits; but by not understanding the nature of them, are prevented from making the attempt. In order to do away with this difficulty in part, I will engage to give them all the knowledge I have on this subject, which will cost but a trifling sum, compared to the years of time I have been collecting it together.

Those persons who are desirous of obtaining a good collection of tulips, should, by all means, make their selection from some of the established seedsmen or nurserymen; for, to trust to the bulbs that are sold every year, at the *auction* rooms, in nine cases out of twelve, they would be deceived; therefore it is highly recommendable, to make the selection from persons of established *credit*, even if the cost is four times as much, rather than to run any hazard. Supposing the bulbs are on hand, the first step is to prepare for planting: the compost should be a mellow light earth, or leaf soil, (the top spit of an old pasture field,) preferring it rather light, than of a strong binding nature, and well rotted stable manure, blending the whole well together. To three wheel-barrow loads of the soil, add one of manure, and so continue on, until there is enough mixed for use. This will be found to be an excellent compost for the growth of the tulip, if it has been thoroughly made. The beds should be four feet in width, and from twenty to thirty feet, more or less, in length; preference should be given to a plat of ground that is well sheltered from the north-west and easterly winds, observing to keep away from the shade of large trees as much as possible. Having decided upon the location, go to work, and throw out the whole of the surface and under soil, to the depth of two and a half feet, taking it away to some convenient place, leaving the bottom of the bed nice and level; then look out for some good stable manure, about half rotted, for the purpose of laying at the bottom, about six inches thick; this will leave two feet in depth for the compost; this may appear, to some people, altogether superfluous; nevertheless, it ought to be done, for this reason; the manure will be in an excellent condition for mixing with the soil the succeeding year. I shall here observe, that it is not necessary to prepare a fresh compost every year, after such an one has been made as here recommended. If the operator thinks the soil ought to be renewed in some degree the second season, a portion could be taken away from the bed, and replaced with some fresh compost, and so on year after year, never neglecting to place the manure at the *bottom* of the bed, as before stated: to do this properly, begin at one end, and take out the whole of the soil, until you come to the bottom of the bed. If it was made four feet in width, take four feet in length; this will leave a trench four feet square, and two and a half feet deep; wheel the soil thrown out, to the other end of the bed, in order to finish off with. The manure should now be laid at the bottom at the depth proposed; mark off again four feet in length, and place the top spit immediately on the manure, continuing so to do, until you have a similar trench at the other end; this will completely change the compost every year, by bringing the under soil to the surface, which is of great importance—level off with the soil which was wheeled to the opposite end of the bed from where the trenching was begun.

But to return to the planting of the bulbs the first year. I shall suppose the bed or beds are already filled up with the compost a little above the level of the ground; allowing it to settle to the original level: this ought to be done the first week in November; the second week, have the surface of the bed raked perfectly smooth and even; then stretch a line tight and straight the whole length of the bed six inches from the front side, and with a small piece of stick mark off close to the line; remove the line again six inches, and mark off, and so go on, until you have six straight lines the length of the bed; this will leave six inches clear, both at the front and back; then mark off across the bed, six inches apart; this will leave the whole of the bed in six inch squares. At the angle of each square, or where the lines are crossed, place a handful of sand. If the day is fine, go to work and plant the bulbs immediately, for there is no trusting to the weather, at this season of the year. Place a bulb in the centre of each handful of sand that was put there for this purpose. When the bed is planted, cover them with a compost similar to that they are to grow in, three inches deep; observe to mulch the beds over with leaves or litter, about six or eight inches, before the approach of severe frosts; it is also indispensably necessary to have a light frame built over the bed, for the purpose of fixing upon it a light canvass, or strong cotton cloth, to shade the flowers from sudden storms of wind, rain, early frost, and particularly the hot sun. In the spring of the year, some tulip growers make use of hoops bent over the beds at regular distances, and throw over bass mats; but a permanent frame would be but a trifling expense, and is much to be preferred. As to the size of the frame, every one can suit their own taste in the dimensions of it; all that is necessary is, to secure the plants and flowers from the before mentioned casualties. Take off the covering of leaves, &c., in the spring, as soon as the plants begin to make their appearance, and with a trowel or small fork, stir up the soil a little between each row, and leave the whole smooth and neat; now begin to make a quantity of small neat stakes, about two and a half feet in length, for securing the flower stems to, beginning at one end of the bed, and placing a stake in the centre of the four first plants. Procure some lead wire, and twisting it once or twice round the stake, you will find that there is only three inches to go to reach the flower stems of four tulips; twist it once round the stem carefully, leaving room enough for it to play about easy; thus it will take three stakes to secure twelve of the flower stems, which, if neatly done, will have an elegant effect. After flowering, the tops will soon begin to decay; and when yellow, or dead, the bulbs ought to be taken up and laid away from the sun to dry a day or two; then clean and place them in a dry room, there to remain till the time of planting; look over them occasionally, to see that they are all in good order.

Tulips are known by the following names: *early tulips*, which flower about a fortnight before all others; *bizarres*, which have a yellow ground, striped with brown, purple and violet, with intermediate shades; violet and rose *bibloemens*, which have a white ground, striped with violet, purple, black, cherry, rose, and intermediate shades: these are considered the most valuable by the florist; *baguets*, which are nearly allied to bibloemens, but are much stronger in their growth, and more gross in their colors; *double* and *parrot* tulips are esteemed mostly as border flowers.

Yours,

J. W. RUSSELL.

Mount Auburn, Cambridge, Oct. 12th, 1835.

EXPERIMENT OF ASHES AND GYPSUM AS A MANURE FOR CORN. PLAN FOR MANAGING TOBACCO PLANT BEDS.

To the Editor of the Farmers' Register.

I promised (in due time) to send you the result of a small experiment on the application of plaster and spent ashes to corn, mixed in the proportion of one-third plaster, and applying a single handful to each hill of corn. I have now gathered and measured the corn on six acres—which was all I could manure in this way, in consequence of the want of ashes. The result is, forty-nine barrels and a half on the six acres. It is proper to state, that the land was very poor—a part of it had been cow-penned during the previous summer; another part was a complete gall, without soil upon it, and a small part, (less than an acre,) the margin of a branch. I do not believe the six acres, without the plaster and ashes, would have made fifteen barrels, even in this favorable year—the corn adjoining this, on similar land, being an indifferent crop, though it received precisely the same cultivation. Nor have I a doubt that I might have had nearly double the crop on the six acres, if I had doubled the quantity of hills, as the stalks are universally large and luxuriant—larger than I ever saw on high land. Although this result falls far short of the produce in Maryland, under similar treatment, yet I am well pleased with it—having trebled the crop I had hitherto expected to reap from such land; and I have now no doubt, that where ashes are attainable in sufficient quantities, the crop of corn may be always doubled at least—perhaps in most cases on poor high land, quadrupled. It may be necessary to state, that my six acres were laid off in horizontal rows, five feet and a half apart, the corn being dropped in the row at intervals of about three—one stalk generally in a hill, occasionally two. It received but two ploughings and one hoeing—but would have been much benefited by another ploughing, which I would have given it had my other farming operations permitted it.

I have thus, Mr. Editor, redeemed my promise to give you the result of this first experiment on the use of plaster and ashes combined. I am not chemist enough to know whether the combination of the two, produces a stronger manure than either alone; of this, however, I am certain, that no use of plaster on my plantation has ever produced so great effect as this combined use of plaster and ashes.

Whilst I have the materials for writing before me, I will add a piece of information for the benefit of your readers who make tobacco, (doubtless known already to many, but which others may profit by—) on the rearing of early and good plants. I have tried the method I shall recommend, for three years, with entire success; so have others of my neighborhood. The plan is exceedingly simple and easy of practice, viz: to underlay the plant bed previous to sowing it, with tobacco stalks, covering them about three inches deep with earth. This may be done by the plough, where the bed is clear of roots and stumps, or else with the hoe, by digging trenches parallel to each other, and nearly touching each other, until the whole bed is gone over, filling up the last trench dug (after pulling therein the stalks) with the dirt that comes out of the next. If a plant bed thus manured fails, every body else in that neighborhood will certainly fail too, to raise plants that season. Mr. Old of Powhatan, (whose reputation as a tobacco maker, stands so deservedly high,) tried this plan last spring with the most perfect success.

H. M.

Nov. 13th, 1835.

THE FARMER'S PROVERBS.

To the Editor of the Farmers' Register.

Most of the ideas contained in the following piece are familiar to old farmers and house-keepers. I have adopted this mode of writing to notch them deep on the minds of the juniors. A sentence short in construction remains longer in recollection. I have not prepared my bits for fine scholars, but for plain farmers—not for reading men, but for working men.

A lean wood-pile makes a fat grave-yard.

If you feed low, you must work slow.

Clean out your spring often, if you would see the doctor seldom.

Small cabins make large grave-yards—much filth, much physic.

Feed well, and you will breed well.

Smooth gear makes smooth ploughing—when the collar chafes the skin, the plough won't go in. The horse sweats least when the gear fits best.

An empty belly makes a sore back. The saddle is damned when the fault is in the feed. Good feeding makes the best padding.

A neat floor is an enemy to flies—but a dirty one is a friend to fleas.

A foul yard invites sickness—but a neat one chaseth away fevers.

A neat cook makes a neat kitchen, and a neat kitchen makes a neat table.

A weak fence makes a strong foe—but firm stakes make firm friendships. Fence in your stock if you would fence out the devil. One bad sow will make many bad quarrels. A sow that has lost her ears should also lose her life—for among the overseers she'll cause a deal of strife.

Bad shoes in winter make bad coughs. Mend your shoes and break your colds. Every new stitch in an old shoe saves a penny in a new bill. A penny given to a coarse shoemaker is a pound taken from a fine doctor.

Fleas in the cabin will make grass in the cornfield—for he that catches fleas by night will catch sleep by day. Where the laborer is asleep there the grass is awake. Dull licks make brisk weeds.

A mean overseer is a plantation cancer: immediate excision is the best cure.

An overseer's cow makes the best beef, but her calf the poorest veal.

The employer's family drink blue milk, but the overseer's children spoon up cream, and butter lieth thick on their bread. His cow findeth the way to the meadow and the hay that is forbidden—she eateth thereof—her bag is swollen, and her teats stand out—she letteth down her milk, and the piggin overfloweth—daily her churn foameth, and her rich butter is gathered into the plate. She is never found in the mire, nor doth the hollow-horn find her out. She is the queen of the pasture, and her horns are the terror of the cowpen. Many cows have given milk, but she excelleth them all.

Home weaving overgoeth, but that done from home lacketh filling. There are some who are without sheep, yet have plenty of yarn, while they that have many sheep lack wool.

There are some who have an empty meat house yet a full pot—an empty crib, yet a full oven. They spin not, yet are they clothed—they toil not, yet are they fed. Their horses graze, yet they have no pasture—and their cows calve without a bull. Their mares foal without a stallion. This is a sore evil under the sun.

Others there are that find tools that were not lost—pick wool from dead sheep—pull down fences they built not—gather fruit from other men's trees—that go on errands where they have no business—that thump your melons with roguish fingers, and open them too by the light of the moon. They are the *republican night-walkers*—aristocracy haters—too free to work—want all things in common, as they have nothing in particular—hate those that have, because they have not. They never beg—ever buying, but never paying—never failing in promises, but ever failing in performances—too proud to work, but not too honest to steal. This is another great evil under the sun.

A new hoop saves an old tub, but new cider will burst an old barrel.

Build no new nest out of old straw, for instead of brooding eggs you will be breeding lice.

Never over-cock your poultry yard, for where there is much fighting there is but little gain.

A nest without the house is better than a nest within—for lice within are worse than rain without.

Take care of poor spots and the rich spots will take care of themselves. "He that giveth to the rich robbeth the poor, but he that giveth to the poor shall be repaid."

He that tilleth very poor land sendeth good corn after worthless *nubbings*. Poor land receives good currency, but pays bad money. It borrows hard money and pays back bad paper.

Provide fuel for summer, and winter will take care of itself—for winter is a tight overseer, but summer is an indulgent master.

With your work always keep ahead, and the grass won't grow behind you. If the work is behind-hand, the grass will be before-hand.

He that works his crop badly will be over-cropped sadly—for to slight work is to increase work.

When overseers become gentlemen, the master must become overseer, or the slave becomes a freeman.

Overseers are often guilty of *oversights*.

He that works of nights sleeps of days—night workers are bad croppers.

If you lose oversight of your overseer, he will lose sight of your business—strict employers make attentive overseers. An overseer neglected is one soon ejected. If the master is much at home, the overseer is but seldom abroad—if one is a man of pleasure, the other will be a man of leisure.

When your overseer puts a black man in his place, he gives a lesson to his employer. If "uncle Tom" is to manage, let uncle Tom have the honor, and his master save the wages.

If you will cure the gall, you will not have the gulley—a gall for want of mending is a gulley in the ending.

Keep your hogs lean or the rogues will be fat. A poor hog is better than no hog. A poor pig in hand is better than a fat pig out of pocket. A mean hog in safety is worth more than a fine one in danger.

A PLAIN OLD FARMER.

From the Essex North Register.

DIRECTIONS FOR WASHING CLOTHES.

In this day of improvements, few have been suggested of more importance, especially to females, than the new mode of washing clothes, which has been introduced into this town [Newburyport] through the agency of two benevolent individuals, now residing at a distance from us. It has been tried by quite a number of females with complete success, and those who have tried it are desirous of communicating it extensively, that others may reap the same benefit which has accrued to them. It is to be used only for white clothes. It does not answer the purpose in case of calicoes and woollens.

1. *Mixture*—Five gallons soft water, add half a gallon of lime water, a pint and a half of soft soap, or a pound of hard soap, and two ounces of carbonate of soda.

2. *Method of washing*—Soak the clothes over night if very dirty, at any rate wet them thoroughly before putting them into the mixture. When the above mixture is at *boiling heat*, put in the clothes that have been soaked or wet, merely rubbing such parts with a little soap that are unusually soiled. Boil them *one hour*. They are then to be taken out and drained, and thoroughly rinsed in warm water, then in the indigo water as usual, and they are fit for drying. The lime water may be prepared and kept on hand—the soda, sub carbonate, (be sure to get the right kind) may be procured cheap, by purchasing it in a large quantity. Let all who feel that washing-day is a day of hard work and weariness, cease to complain, until they are willing to try this safe, easy and expeditious mode of lightening their burdens.

ADVANTAGES OF CULTIVATING CORN BY CROSS PLOUGHING.

To the Editor of the Farmers' Register.

Norfolk County, Nov. 12th, 1835.

As a subscriber to your valuable publication, and one who wishes it great success, I have thought proper, "it being a privilege," to offer a few remarks on the growth and culture of Indian corn, that may perhaps be novel to some of your readers; I offer as my apology, the pleasure that has often been realized from reading your journal, and gratitude prompts me to attempt some feeble return.

No species of literature affords more useful instruction, than that which leads to the knowledge of extracting from the soil, in the most easy and abundant manner, the best food for man and beast, and which shall leave it in the best situation for similar returns; and no grain more imperiously demands the notice of the agriculturist, than that which is best suited to his various demands, in sustaining health and life, and in suiting itself to the various kinds of stock which are indispensable for his support and comfort. Then may not Indian corn be justly called the "Jaquin and Boaz" of the farmer's support; for there is no crop so well suited to his wants, his interests, or his convenience—none less capricious or uncertain in its returns for labor—none better adapted to the various kinds of soil and climate that surround him—none less choice in its selection of food for support—nor more profitable and fruitful in its returns—but like all other crops, its products may be increased or diminished, according to the mode of cultivation. Though every tiller of the soil in our country is a cultivator of corn, and though it forms the larger part of his crop, still the proper mode of cultivation is so little known, and the little known, is as much disputed, as any other agricultural question that can be named. Is it not much to be lamented, that a grain in every way so well suited to our needs, so easily and surely raised, and so ancient of use, should be so little understood, as to the most suitable way of cultivation? Must we adopt the idea, so long discarded, "that man is not fond of novelty, change, or experiment;" or that agricultural wisdom has been purchased at too dear a price—having either by it, suffered ourselves, or seen others suffer severely, by hastily adopting novel plans of improvement, which had nothing to recommend them but the loud and extravagant praises of the propagators? Often we suffer ourselves to become prejudiced against a change in conducting any concern of life, and obstinately persist in old practices, merely because a trial has been made of them, although constantly witnessing and acknowledging their defects, rather than expose ourselves to the hazard of failure. If we are travelling the old beaten path of our ancestors, or pursuing the same course with our neighbors, we rest satisfied with the result, be it small or great, without, for a moment, making the inquiry whether, by substituting some other mode in lieu of our own, the quantum raised would not be increased, and the labor lessened. Or, should a failure take place, which would be by no means a novelty, it is never attributed to mismanagement in culture, but invariably to the unsuitableness of the season. It is a common saying among Virginia farmers, should their corn crops come in light, "that there was either too much rain, or drought," whilst the fact was notorious, that some of their near neighbors, had a heavy and plentiful harvest.

There are two prominent systems common with us, for the cultivation of corn. The drill system, of which Col. Taylor, late of Caroline, is justly the author; and another system more ancient, that of the cross-ploughing—but in either, the adherents vary in many particulars, but in none, very essentially. The former requires less ploughing and more hand hoeing—whilst the latter requires more ploughing and less hand hoeing; but their dissimilarity is not confined alone to these peculiarities; for the theory upon which their individual modes of cultivation are based, is essentially different. Is it not a palpable absurdity to suppose that both systems can be best under any circumstances? For the one supposes it an injury to the growing plant to cut its roots—whilst the other supposes it a benefit. Both of these systems, founded upon such opposite theories, cannot be correct; for if it be detrimental to the plant at every stage of its growth, to break its roots, then the cross-ploughing system must inevitably be the worst; but if the breaking of roots be no injury, but a benefit, then the drill system cannot be the best. But I am disposed to favor the supposition, that the breaking the roots that fasten on, or near the surface of the soil, is not an injury, but a benefit; for so soon as they are broken, an innumerable quantity of young fibres are thrown out, which fasten in new soil, and consequently, the quantity of sap is increased, because the number of absorbent vessels are increased. Again: the fact is obvious, that the simply running a light iron-tooth harrow over all kinds of small grain, is of infinite service to it—(in the spring season of the year.) Now, how can the fact be accounted for, upon philosophical principles, if the supposition is discarded, that it is not a benefit to break the roots of growing plants? If the appearance of a field of small grain, immediately after the operation, was to be the criterion by which its effects was to be tested, no farmer in his senses could admit it in any way beneficial—for to all appearance, a more rash operation could not be performed. But the fact is clear and undeniable, that it is productive of the happiest effect. I know not how, in any possible manner, to account for the circumstance, if this idea be taken away from me—for if it be an injury to break the roots of corn, or any other grain, it is to me surprising, how the adherents of the cross-ploughing system should make even half crops, or that it does not inevitably ruin any small grain crop, over which an iron-tooth harrow is dragged. The advantages of this, the cross-ploughing system, over the drill, have been strikingly verified in this neighborhood, and fair and ample opportunities have been offered, in testing the comparative superiority of one over the other; for until the last three years, there was not a farmer of any celebrity among us, but who strictly pursued the course recommended by the "justly high famed farmer of Caroline," and verily believed it best; until an industrious and enterprizing Eastern Shore farmer settled among us, on very poor land, and commenced his plan of cultivating Indian corn. The labor-saving system which he rigidly pursued, and the fine appearance of his crop, created at that time, considerable excitement in the neighborhood. Fame having borne the exalted superiority of his crop over that of his neighbors, on land of like character, among the many that went to see for themselves, I, like the queen of Sheba, determined to see in person. It is true the half had been told me—for the novelty of his plan gave no latitude to exaggeration, but I was truly surprised to see so heavy a crop made by such simple means. He informed me afterwards, that his crop yielded him one hundred barrels—and strange to say, all the cultivation it received, was given it with one plough, without a single hand-hoeing after planting. I asked him afterwards to allow me to become one of his club, by initiating me into the secret, which he did with apparent pleasure; and having for myself tested its labor-saving advantages upon the crop now standing in the field, I will give you the mode, to dispose of, as you please. To many of your subscribers it may not be new—as it is the common course pursued on the Eastern Shore of Virginia, and, for aught I know, many, if not a very large majority, may have practiced it for many years; but should there be one who has never heard of it and would be disposed to profit by the information, then I shall be amply compensated for the task. The system is an extraordinary one—where all the labor is performed by team, and hand-hoeing entirely dispensed with. The field to be cultivated is first fallowed up (during the fall or winter,) in beds forty or fifty feet wide—the wider the better. At planting time it is accurately laid off one way in rows five feet apart, by running a very deep furrow and throwing the slice back again; it is then cross-checked in rows two and a half, three, or four feet wide, proportioned to the strength of the soil—where the checks intersecting each other receive the corn, which is covered with hoes or horses, according to choice or convenience: there is kept up afterwards an alternate succession of cross ploughing, the bar next to, and as near the corn as possible; the field should be gone over twice after this manner, without shifting the position of the plough. The corn is then left standing on a very small square of ground. By this time it is strong enough to bear a gentle earthing with the mould-board. Then the same process is kept up with the mould-board run next the corn, until it shows the first symptoms of tasseling. The ploughs are then laid aside, and the five-tooth cultivator is substituted in lieu thereof—the same system is kept up with them until the shoots and silks fully develope themselves: then all further cultivation ceases, or in other words, the corn is *laid by*. The rotation of ploughing is in such rapid succession, that grass has no opportunity to fix itself on any part of the field; but should it spring so very near the plant, as to be difficult to to remove it in the young stage of the plant, when the mould-board is turned, it is soon covered over and killed; so the process is so very simple that the way-faring man, though a fool, need not err therefrom. If the crop is well laid off, the battle is half won. This year is my first attempt after this manner. A field of two hundred acres was cultivated with six ploughs, exclusive of hand-hoeing after planting, and as far as I can judge of it, standing on the field, to say the least of it, is as good as I ever made: and so far as others have tried it, success has attended the experiment. From the entire success that has attended this mode of cultivation, and the many failures that have attended the drill system, I can but believe that the cross-ploughing system almost under any circumstances, is decidedly best. Though I am partial to the Eastern Shore plan, it is not yet perfect. In the stretch of economy, too much space has been left. The no-hoe system, (as I beg leave to call it,) may be happily adapted to some peculiar kinds of soil—such as are common on the Eastern Shore—a dry sandy soil. But in a country like ours, where such a soil is not common, and grass grows kind and abundant, it would be safer to adopt a medium system—for the crop to receive one hand-hoeing and the ploughs to finish the cultivation: further than one hand-hoeing would be a superfluous waste of labor, except on newly cleared land, where the ploughs could not perform their part with correctness and facility.

With the projected improvement, this system offers many advantages over any other that I am acquainted with—for, at almost all stages of the cultivation, it presents a level surface, which is the best situation that land can be in to derive the full benefit of the rains, which is so essential to a heavy product. This is a consideration too often overlooked by most of our farmers—for soil is only the laboratory in which the food for plants is prepared; nor can manure be taken up by the roots of plants unless water is present. It is the opinion of Sir Humphrey Davy, that water forms by far the greatest part of the sap of plants, and that this substance, or its elements, enters largely into the constitution of their organs and solid productions. A level surface then, permits the rains to exert an equal influence on all parts of the land alike. Unlike the ridge or drill system, when the rains fall on the ridges it does not penetrate, but runs directly off into the water furrows, from whence it is conveyed to the ditches, without being permitted to benefit the growing crop to its extent: so that system of cultivation which affords the greatest facilities to the perfect action of the vital support of all plants, must be best. But the objector may insist that a level surface leaves the plant too much exposed to the blighting influence of a superabundance of water. "Such a crop season would rather be a novelty—for drought has been the most prominent characteristic of our summers." But should the order of things change, and our seasons become wet, still I am of the opinion that a level surface would possess the most advantages —(I well know the ground which I occupy to be disputed, and I would not presume an opinion if observation had not first given it) for if the surface be level, the water will pass off through its natural sources to the ditches or drains—for by one of the immutable laws of that unstable element, it must find its level, and no barrier is insurmountable in obeying that law; by it, avenues or ravines have been forced, through which it communicates itself until it finds in first station, the ocean. So upon the level surface system, the superabundant water passes off the same way that it did before the land was in cultivation, assisted by ditches, to hasten its passage. But upon the ridge system, these natural ravines or conductors are obstructed by the ridges crossing them: so the water is not permitted to pass off its own way, without breaking through, and washing away these newly formed barriers. It then necessarily must stand in the water-furrow, and exert its worst influence on the growing crop. There are many more advantages that this system offers —that of seeding small grain—also, to derive the full benefits of the sun's rays, to warm the earth alike. But whether it possesses an advantage over the drill cultivation or not, as it regards the best or worst position of the surface during cultivation or after, one fact is certain, that there is involved in it one of the most prominent features of agricultural reform—that of saving labor—and can command the best argument in its behalf—that of unrivalled success. When labor can be saved, and success is certain, with the prudent husbandman it will weigh more than all the speculative deductions, and plausible theories, that the most learned or scientific can offer. For there is no experimental farmer among us but what has tested the truth of Johnson's remark, that in agricultural matters, practice is contradicting theory every day. My remarks, are with you, to dispose of as you please. They have but one merit—that, "facts are stated."

A. S. F.

DESCRIPTION OF CERTAIN REMARKABLE PRAIRIE AND WOODLAND SOILS OF ALABAMA.

To the Editor of the Farmers' Register.

Erie, Greene Co., Ala.
September 7th, 1835.

The October No. of the Farmers' Register, containing your dissertation upon the prairies, and the analyses of the soils, came duly to hand. I am very much surprized that the specimens from Noscubee county contained no carbonate of lime. It not only militates against your theory of the formation of prairies, but also against our pre-conceived opinion that the rust is caused by an excess of lime in the soil. I had for some time, however, abandoned that opinion from observing that where the prairie joins, or runs into, the sandy soil, the cotton rusts more than in the open prairie—particularly where there is no clay near the surface. I have had some specimens of our prairie soils some time for you, but have not had time to put them up and send them.

No. 1 is of the kind of soil I have just been speaking—a loose dark friable sandy loam; whether calcareous or not, I cannot say, as it is very much like No. 12 of the specimens reported in the October No. of the Farmers' Register.*

No. 2 is from our open or bald prairie, which has been cultivated seven or eight years—taken from near the same place; produces corn very well—nearly fifty bushels to the acre are now standing on the ground; but cotton does not produce so well on it as on poor sandy soil. I feel very confident that this specimen is highly calcareous, as there are many fragments of shells mixed with the soil, and the rock is not two feet from the surface. Of all the specimens hitherto sent, this is the one which will give the nearest approach to the general character of our open prairie land in this part of the country.†

No 3 is from the post oak land immediately adjoining the prairies. It is a very tenacious, argillaceous soil; produces cotton well, but is difficult to cultivate from its tenacious character, which causes it to retain its moisture in excess; hence it is very muddy in rainy seasons, and very hard in wet. There are some considerable bodies of this kind of soil interspersed among the prairies, but generally, it is very poor, and produces very badly. Cotton succeeds better on it than corn, and it is too wet in winter for small grain. The color is from a white livery to a chocolate. In some of it, there is scarcely any sand apparently, and the roads through it in winter become impassable for loaded carriages.*

The next specimen, No. 4,† is from Madison county, in this state, about half way between Whitesburg and Huntsville. It is a fair specimen of their best soils—was taken from near the surface of land which has been cultivated for many years. It originally produced corn and cotton very well; but that part of the state can no longer vie with the south in raising the latter article, even where the lands are fertile. The knobs and spurs of the Cumberland mountain are interspersed very generally over Madison county—and this specimen was taken not far from a mountain of blue limestone rock; yet, judging from the result of your other investigations into the nature of similar soils, I should doubt whether you would find calcareous matter in any excess. Most of the blue limestone region of the western country is of a similar soil. After crossing the Tennesee river at Whitesburg, or Ditto's Landing, and proceeding five miles south, you ascend the main Cumberland mountain, which is about a mile and a half, as the road runs, to the top. Before you reach the top, however, the rock changes from a blue limestone to sandstone, and continues of this description till you get into Jones' Valley, near Elyton, where the limestone is again seen in parallel laminæ, extending north and south, and varying from about 45 to 80° of elevation. The last traces of the blue limestone are about sixteen miles east from Tuscaloosa, where they burn a good deal of rock lime for the country below. All this country from near Tennessee river to the city of Tuscaloosa, is full of excellent pit coal—the inhabitants digging it up out of the beds of creeks, &c. for their forges, and for fuel—when they use it at all. The face of the country is generally broken and poor, until you get to the rotten limestone region, about forty miles south of Tuscaloosa, from whence I send you the first three specimens.

ROBERT W. WITHERS.

*This specimen, upon examination, was found to contain 8 per cent. of carbonate of lime. Ed.

†No 2 contained 33 per cent. of carbonate of lime. This, as a specimen of the most general quality of prairie soil, (as Dr. Withers thinks,) deserves particular notice.

*No. 3 contained no carbonate of lime.

†No 4—also none. Ed. Farm. Reg.

From the American Gardener's Magazine.

ON THE CULTIVATION OF HYACINTHS IN GLASSES AND POTS.

The following observations, though not written expressly for this Magazine, we have thought might be of considerable interest to many of our readers who cultivate hyacinths and other bulbs. The season is now approaching for planting them and many may be induced to grow a few, who have heretofore been prevented, from the want of information on the subject. Hyacinths in glasses, it cannot be supposed will flower as well as when in pots; but they have a very beautiful appearance, and flower sufficiently strong to render them highly desirable.

For this purpose, the earliest kinds should be selected; and we would state, that we prefer single to double ones, or at least, an equal number of each, for the following reasons: the spikes are much taller, the bells far more numerous, the colors more vivid, and the fragrance very powerful; indeed, in some of the best kinds, the bells are so profuse as to form a complete pyramid of flowers. If attention is given to the following simple observations, no fear need be entertained of disappointment.

Select good large solid bulbs, especially for glasses; we have often seen it stated in the communications of experienced growers, that "small bulbs are worse than useless;" it is labor lost, to cultivate those which are sold at *auction;* they are the mere *refuse* of the Dutch florists, such as would be thrown away as worthless; the roots are weak, and would fail to flower well if put in their natural element, the earth; much more so if in an artificial one of water. How frequent we have heard complaints that bulbs start well, make a rapid growth of an inch or two, and then stop; the flower stems dying ere a flower opens. This is from the cause that there is not sap enough stored in the bulb the preceding year; and it must consequently make a premature and sickly growth the following one. Unless attention is paid to the selection of first rate bulbs, disappointment must certainly ensue. All complaints arise from this cause; and if *cheap* bulbs are cultivated, *cheap* looking flowers must also repay amateurs for their care.

Management in glasses.—The bulbs may be put in the glasses any time from October to January; when a succession of flowers is wanted, they may be put in every fortnight. Place in the bulbs, and then fill up with water just so that the bottoms of each will be immersed an eighth of an inch; then put the glasses in a dark cool room until the roots have protruded a half an inch, or so, which is generally in about ten days. They should then be exposed to the sun, light and air, as much as possible. If they receive the sun on one side only, turn them round every two or three days to prevent their growing crooked. Change the water once a week; if the glasses get very dirty, draw out the roots carefully, and give them a thorough washing. The water should not be allowed to freeze. Any *pure* water will do; but rain water is the best.

After bulbs are grown in water, they are not worth saving; as it will take three or four years to recover their strength.

Management in pots.—To bloom hyacinths to perfection, the pots should be seven inches in diameter and ten inches deep; plant only one in each pot; it is almost unnecessary to say, that it is folly to expect to procure fine flowers from a bulb in a pot scarcely large enough to hold a crocus. Put in some broken potshreds in each pot; fill them up with the soil before recommended, and place in the bulb, just covering it; give the pot a gentle knock to settle the soil. Select a dry spot in the garden, and dig a hole eighteen inches deep; place in the pots, and cover them up with the earth six or more inches in depth; upon the approach of frost, cover them with dry leaves, sea-weed or hay. They should all be planted at one period, during the month of November.

Two or more pots can be taken up at any time throughout the winter, thus giving a succession of flowers from January until April. If there is no garden to place the pots in, they should be put in a box in a cool cellar, and covered with earth in the same manner. This is the method we have practised, and have never failed in blooming them well. We have had the main stems of some single ones eighteen inches high, with upwards of *fifty bells*, forming a pyramid of flowers more than twelve inches in height. It cannot be supposed that a bulb, set in a pot and immediately forced into growth, will flower strong; they must acquire roots first to support the foliage.

When they are in flower, give them plenty of water, by placing pans under the pots, and keeping them constantly filled. We have seen manure water recommended, but we have never, ourselves, tried the experiment; cease to give water when out of flower, and discontinue it altogether when the leaves assume a decaying appearance.

Roots that have flowered in pots are but little injured, and will bloom tolerably strong the next season, if set out in the ground; the same bulb should never be set in a pot two successive years, but by shifting them alternately, from the pot to the garden, they may be made to flower vigorously.

The management of the hyacinth in beds, to flower them to perfection, will be given in some future number.

As many of our readers may not know what constitutes the properties of a fine hyacinth, we extract the following from Maddock's Florist's Directory:

"The stem should be strong, tall, and erect, supporting numerous large bells, each suspended by a short and strong peduncle or footstalk, in a horizontal position, so that the whole may have a compact, pyramidal form, with the crown or uppermost flower perfectly erect. The flowers should be large and perfectly double; that is, well filled with broad, bold petals, appearing to the eye rather convex than flat or hollow: they should occupy about one-half the length of the stem. The colors should be clear and bright, whether plain, red, white or blue, or variously intermixed and diversified in the eye: the latter, it must be confessed, gives additional lustre and elegance to this beautiful flower. Strong, bright colors are, in general, preferred to such as are pale."

The following is a list of superior kinds, and may serve to assist some in making their selections:

Double white.

General Washington.
Prince of Waterloo.
Triumph Blandina.
La Deese.
Miss Kitty, *rosy eye.*
A la Mode, *rosy eye.*

Single white.

Grand Blanch Imperial.
Grand Vainqnier.

La Candeur.
Duc de Cumberland.

Double yellow.

Bouquet d'Orange.
Duc de Berri d'Or.
Ophir.
Louis d'Or.

Single yellow.

Princess Charlotte.
Crœsus.

Double red.

Bouquet tendre.
Groot Voorst.
Marquis de la Coste.
Comte de la Coste.

Single red.

Cochineal, *crimson.*
La Balaine, *rosy.*
Lord Wellington, *rosy.*
L'Eclair.
Mars, *crimson.*

Double blue.

Grand Vedette, *pale.*
Martinet.
Habit Brilliant.
Comte de St. Priest, *pale.*

Single blue.

La Crepuscule.
Grand Vedette.
L'Ami de Cœur.

From the Genesee Farmer.

TRANSPLANTING FRUIT TREES.

This is commonly considered as one of the most difficult operations in the culture of fruit trees; but if properly performed is very rarely attended with any difficulty or risk. It is a very common opinion that a transplanted tree must of necessity continue nearly stationary in its growth for a year or two after the operation, or at best make but comparatively little progress. A tree, however, *properly* transplanted, will experience very little check in its growth, and often apparently none. Hence the very great importance of the operation being well understood. Much has been written in explanation of the theory of successful transplanting; but we merely intend here to give a brief description of the practice which experience has proved to be uniformly attended with success, and the most obvious principles on which it is founded.

There are two great points to be observed in removing trees from the soil; first, to preserve the spongioles uninjured; and secondly, to prevent evaporation, by which the tree becomes dry, and if carried to excess, beyond recovery.

1. *Preservation of the spongioles.* These are the minute spongy extremities of the smallest fibrous or branching thread-like roots, through which, as mouths, the tree receives fluids and other nourishment from the soil, and not through the surface and sides of the roots as is sometimes supposed. As these spongioles are exceedingly delicate in their organization, a very slight degree of violence injures or destroys them. The more carefully therefore trees are removed from the soil, and the more entire the fibrous roots, the greater will be the number of uninjured spongioles remaining, and better will the tree be supplied with nourishment after it is planted again in the soil. And hence the absurdity of the practice, which has been recommended by some writers, of cutting off most of the small fibrous roots because they cannot be easily replaced in their natural position in the soil.

2. *In order to prevent evaporation,* the roots should never be suffered to become dry, but as soon as removed from the ground, they should be enveloped in some damp substance; wetted straw serves well for a temporary protection. But when intended to be conveyed to a distance, and there is a probability of their being several days out of the ground, damp moss should be employed in packing about the roots, as straw is liable to ferment if kept long in a wet state. Previously to packing them in the moss, it is an excellent practice to immerse the roots in soft mud or a mixture of the soil and water, so as to coat their surfaces, after which dust or dry sand is to be sprinkled copiously over them to complete the coating.

The *holes* for receiving the trees should be dug large—not less than five or six feet in diameter at the very least, and eighteen inches deep. The hard and steril subsoil should be thrown out, and its place supplied with rich mould or muck. Where the holes are dug in ground in grass, the turf which is removed from the surface may be inverted in the bottoms. If manure is placed in them, it should be well rotted, and should never be allowed to come in contact with the roots, but should be placed in the bottom, at the surface, and in the more remote parts. The tree should in general be set a little deeper than it originally stood, but not more than two inches; the roots should be spread out horizontally in all directions, so as firmly to brace the trees when they become large; moderately moist and finely pulverized earth should then be gently shaken in about them, so as not to disturb the position of the fibres, until the hole is filled. Care should be taken that all the interstices among the roots be perfectly filled, so as not to leave the smallest cavities; and throwing in the earth in large quantities should for this reason be especially avoided. In order that the soil may be gently packed on every side of all the roots, it is very useful when the soil is inclining to dryness, to pour in a quantity of water as soon as the roots are covered, and then the remainder of the earth shoveled in, which latter prevents the surface from becoming hard by baking. After the operation is finished, a stake should be set in the ground leaning towards the tree, to which it should be tied with a band of matting or of straw, to brace it firmly in an upright position.

Placing the tree leaning a little towards the south or southwest, or with the most projecting branches in that direction, will prevent the trunk being injured by the action of the rays of the sun in hot summer afternoons, an evil which is sometimes so serious as to cause the death of the tree.

Autumn is ordinarily the best time for removing trees—more time is then afforded than in the hurrying season of spring—besides which the earth becomes more settled about the roots, and new spongioles are produced in place of those which may have been destroyed, especially if the operation is not performed too late in autumn. Better trees also may be obtained in autumn than in spring after nurseries have been culled. But if tender kinds be transplanted in the fall, and particularly if they be removed to a colder section of the country, they will, from their mutilated state, be more liable to injury from frost. To those therefore, who live remote, and are unable to obtain such trees for early planting in spring, or those who live in the colder regions of the country, we would recommend to procure their trees in autumn, and bury the roots and a part of the stem and branches in a trench dug for the purpose, the roots being packed closely together, and the branches resting in an inclined position upon the earth; which operation is technically termed by nurserymen, *laying in by the heel.* In this way they may be effectually protected from injury from the frosts of winter.

Nothing is more common than to loose trees by transplanting; but there is no necessity for such failure;—if trees are transplanted with proper care, there will be an almost absolute certainty of their living. If when they are taken from the earth, care is taken to remove the roots entire—to keep them fresh—and in replacing them in the soil, to pack finely pulverized earth well about the roots, preserving them in their natural position, there can be little danger of success.

But it is not only necessary the trees should *live*, but that they should *thrive* also; and for this object, it is indispensably requisite that they should have a large deep bed of loose soil for the roots to penetrate. If the ground is of a hard or heavy nature, the holes must be made large and deep and filled with the proper materials, for if the roots are confined in small holes dug in such ground, they will succeed little better than if planted in a small box of earth.

DESCRIPTION OF "CAMEL" LIGHTERS, FOR CARRYING MARL.

[The excellency of the plan of the vessels described below, will strike every one who has had experience of the difficulties attending those of the ordinary construction—and we doubt not that, by their introduction, our correspondent will serve the public interest as well as his own. In loading and unloading the ordinary decked lighters, there is great loss of labor; and open lighters loaded with marl, are in great danger from storms. Both these great objections seem to be obviated by this plan, besides attaining some less advantages.]

To the Editor of the Farmers' Register.

November, 1835.

I have just been reading the last number of your useful journal. The first article that met my eye was *editorial*, and headed "facts wanting." This at least shows candor. Such complaints generally proceed from the opposite quarter. Well, then, in the words of a noted bibliopolist, when puffing a favorite article, "the absolute fact is" that I do not know I can at this time, or perhaps at any other time, do a more acceptable service to the agricultural interest, in eastern Virginia, than by describing and recommending a sort of lighter I have been lately building for the transportation of marl. It is significantly called a "camel," from its receiving the load on the back—in other words, the deck. Its recommendations are its simplicity and cheapness, buoyancy, and consequent security against storms, and the facility with which the load may be discharged. These advantages will, I think, be palpable, from a mere description. I here take pleasure in acknowledging the obligation I am under to an observant friend, for suggesting the plan—and indeed for the personal superintendence and instruction, which enabled me to overcome the prejudices of a ship carpenter, whom I had employed on the occasion. This individual had no idea of a decked lighter, without knees, carlines, keelsons and other things, hard to call, and still harder to get, and to work when got. By mingled entreaty and command, he was induced to build a camel; and now no one is more clearly impressed with their utility. To show my opinion of their superiority, I will state that I have three completed. I had previously commenced an open one, now on the stocks, which I shall be pleased to dispose of to any of your subscribers in want of such a vessel. The materials are excellent. It can be finished on short notice, and delivered where wanted—though I will be honest enough to say I do not recommend it, except for live stock, wood, and very bulky commodities. But I must stop. I sat down to compose an article for the benefit of others, and lo! I am penning an advertisement to benefit myself. Oh self-interest! what an insidious thing thou art. I do not ascribe to the friend, who communicated the idea of the camels, any merit on the score of invention; and I presume it would be no easy matter to say to whom that is due: for aught I know, to some ancient Egyptian, who hit on the expedient for removing the immense blocks that compose the pyramids. I hope, by the way, for the support of this *ingenious* and *important* supposition, that the aforesaid pyramids are situated near the canals which intersect that celebrated region. The gentleman referred to, happened to be at Old Point a year or two since, at that season when folks do congregate there for health and pleasure, and observed these lighters engaged in the transportation of stone, sand, &c. Some were undergoing repair, which gave a good opportunity of examining their construction. "*Hinc illæ*"—not tears, Mr. Editor, but camel lighters. I cannot give a better illustration of these lighters than by likening them to a *huge, flat, oblong* box, bevelled at each end nearly, but not quite, to the top; and consisting of four longitudinal and parallel planks, viz: the sides and two others intermediate and equi-distant from them and from each other, dividing the box into three long and equal compartments; across and upon which four planks are nailed at the bottom and top. My lighters are 40 feet long at top, and 35 at bottom, 12 feet wide, and about 30 inches deep, including the thickness of the bottom and top planks. These planks are two inches thick, as are the longitudinal ones in the middle. The side planks are three inches, and must, together with the parallel middle ones, in all cases be got the full length of the lighter, for the sake of strength. It would be desirable to have the side pieces of sufficient width to dispense with a seam; but that can rarely be done, and never without great waste of timber, as nothing but heart should be used. It will therefore be advisable to hew the long stocks for this purpose, with two opposite sides, inclined or sloping, with a reduction, graduated by the diminished size of the heart towards the smaller end, so as to preserve the heart, and reject the sap. Two of these planks will form a side, with an oblique seam, by putting a wide and a narrow end together. For want of this simple suggestion, while getting my timber, of which I merely gave my *head* carpenter a bill, I have been compelled to use four long, narrow planks on a side, in one (though only one) of my lighters, with what waste of labor, timber, and caulking, may well be imagined. These side planks, whether two or more, must be fastened together by seven bolts on each side, three-quarters of an inch in diameter, extending from top to bottom, and screwed up so as to make them as compact as possible. Between these bolts, batons one and a half inches thick are nailed on the inside between the bolts. The middle planks, parallel to the sides, may be secured by batons alone, with bridges (as I believe the carpenters call them) introduced in two different places. In cutting timber for the top and bottom planks, it will be some economy to get the stocks of such length as may be divided by the width of the lighter without a remainder—as in mine, 12, 24, or 36 feet. If any sap must be used, it should be at the bottom. In every other situation it should be peremptorily rejected. The spikes for the bottom and top should be wrought, five and three-quarter inches long; those for batons, &c. four and three-quarters. I have mentioned that my lighters are 40 feet long at top and 35 at bottom—each end being bevelled two and a half feet, to within six inches of the top, where an oak piece, four inches square, is let in, across each end of the lighter; the longitudinal middle planks being cut away to receive them. The sides are fastened to the oak pieces by a small horizontal iron knee, one foot each way, secured by four bolts. At the turn of the bottom, where the slope commences, oak timbers, cut of the proper form, two feet long and three inches square, are nailed to the side and middle planks; other pieces are then lapped on them, and extend along the slope up to the transverse oak piece occupying each extreme end. This is done to strengthen the ends of the lighter, the planks on which are doubly spiked, to enable them to bear the violent shocks they will receive on approaching and striking the shore. Having taken these precautions, the bottom, top, and sloping ends, are covered with well jointed plank, nailed cross-wise, and as closely together as possible; the whole is snugly caulked and coated over heavily with pitch. A pump about five feet long, is put in one corner for future occasions, in case a leak should spring; and the lighter, water proof top and bottom, is launched upon its future home. I should remark that four oak standards, two and a half feet long, and three by five inches square, should be ranged along on each side, secured in their places by staples with threads at the ends, and taps—the standards next the ends to serve as rullocks by means of a pin near the top, and the whole to serve for loose planks to rest obliquely against, to prevent any thing from rolling overboard. The oars for such lighters may be 22 feet; the rudder may be a crooked oar in fact, with a hole, to receive a bolt fastened in the stern of the lighter. The lighter above described, it will be perceived, is as tight as a corked bottle, and will so remain as long as it is kept in good order, for which purpose it should from time to time be covered with pitch. It cannot be sunk, though the cargo may be washed overboard; a great advantage, as in my exposed situation, *that* has sooner or later been the fate of all the open lighters I ever owned. It is hardly worth while to observe that suitable apertures should be made in the lower part of the two long partition planks to permit the water, should any ever enter the lighter, to flow from the other compartments into that in which the pump is situated. My lighters were built on blocks raised high enough to allow the workmen to operate beneath. They are calculated to resist high winds: in protected situations, and particularly in narrow and shallow streams, thinner plank than that which I have used, would perhaps answer better; but in regard to that, each one must judge for himself. I have received large quantities of oyster shells, from the vessels, in my lighters, so as to test their utility. I have been too busy since their completion to commence getting marl, but shall in a few days set about that interesting operation; and when well under way, you may perhaps hear from me again to the tune of "the Campbell's (camels) are coming."

H.

For the Farmers' Register.

PROCEEDINGS OF THE BUCKINGHAM AGRICULTURAL SOCIETY.

At the first annual meeting of the Buckingham Agricultural Society, held at Mr. Robert Shaw's on the 15th of October, 1835, the president, Col. Thomas M. Bondurant took his seat, and called the meeting to order. After which, he proceeded to deliver the Annual Address, requested by a resolution of the society. At the close of the address, the following resolution was adopted, viz:—

Resolved, That the president be requested to furnish a copy of his address for publication in the Farmers' Register—and also, that five hundred copies of the same be published for the use of the members.

Maj. Charles Yancey was elected president; Price Perkins, William Woodson and Beverly A. Brown, Esqs. as vice-presidents for the ensuing year.

The committees appointed to award premiums made their reports, which were adopted, viz:—

Hogs. The first premium to Col. C. M. Bondurant's boar Surry. The second premium to Col. T. M. Bondurant's sow Blue Rose. The third premium to Capt. Wm. N. Patteson's boar Buckingham.

Cattle. For the best bull over two years old; the premium to Col. T. M. Bondurant's Durham and Hereford bull Frederick.

For the best bull under two years old—the premium to Capt. Richard G. Morris's North Devon bull Thompson.

For the best cow over three years old—the premium to Richard G. Morris's North Devon cow Odell.

For the best heifer under three years old—the premium to Dr. William P. Moseley's Durham and Hereford heifer Snow Ball.

For the best fatted ox or cow—the first premium to Col. T. M. Bondurant's Red Cow. The second premium to Mr. Price Perkin's Red Ox.

For the best yoke of work oxen—the premium to Robert Shaw, Esq.

Sheep. For the best ram—the premium to Dr. Wm. P. Moseley.

For the pen of six best ewes—the premium to Col. T. M. Bondurant.

Domestic fabrics. For the best suit of clothes—the premium to Col. Jesse Holeman.

For the best piece of negro winter clothing—the premium to Col. T. M. Bondurant.

For the best piece of carpetting—the premium to Col. T. M. Bondurant.

For the best specimen—the premium to Capt. Wm. N. Patteson.

Horses. For the best thorough-bred filly under two years old—the premium to Maj. James M. Patteson's Empress by Tonson, dam by Archer.

For the best brood mare, other than thorough-bred—the premium to Maj. Granderson Moseley's Woodlark, by Powhatan, dam by Cultivator.

For the best colt or filly, other than thorough-bred—the premium to Dr. Wm. P. Moseley's bay filly, by Moderator, dam by Bolivar.

For the best mule raised in the county, under five years old—the premium to Maj. Granderson Moseley.

Resolved, That Col. Thomas M. Bondurant, Dr. Wm. C. Moseley, Maj. Charles Yancey, Maj. James M. Patteson and Col. Beverly A. Brown be appointed to attend a proposed Agricultural Convention in Richmond, sometime the ensuing winter.

Resolved, That the next annual meeting be held at Mr. Robert Shaw's.

Resolved, That the president elect be requested to deliver an address upon the object and utility of agricultural societies.

Resolved, That the foregoing be sent to the Farmers' Register for publication.

Resolved, That this meeting do now adjourn.

THOMAS M. BONDURANT, PREST.

G. N. MOSELEY, R. S.

Address of Col. Thomas M. Bondurant, President of the Buckingham Agricultural Society, delivered at its annual meeting, on the 15th Oct. 1835.

GENTLEMEN:—At your last meeting a resolution was adopted, requesting your president to deliver an address on the "objects and utility of agricultural societies." When I look over this intelligent assembly, I perceive that it is composed of those, who are much better qualified than I am to discarge this duty—those who are able to impart information to me, instead of receiving interest or instruction from any thing that I can say.

This is the first annual meeting of the Buckingham Agricultural Society, and my most ardent wish is, that each succeeding anniversary may be hailed with a deeper interest and a livelier zeal in the cause of agricultural improvement. Could I flatter myself, that my powers of mind were adequate to grasp and exhibit in a proper point of view this great subject, and to impart to it those attractive charms to which it is entitled, I should enter upon the task assigned me with greater confidence, and might be encouraged to hope to draw some new votaries to its shrine. But I am conscious, that, from my limited abilities, I am unable to present this subject in as imposing an attitude as its importance demands. And when I take a survey of the wide and extensive field before me, I am almost tempted to shrink from the undertaking; but, as it has been my course through life never to shun any duty that might be required of me, I shall, in a plain and brief, though I fear, an unconnected and uninteresting manner, attempt to perform the one which you have imposed upon me. In the performance of this duty, I throw myself upon your kindness and indulgence, trusting that my zeal in a good cause may compensate, in some degree, for my many imperfections.

In speaking of the objects and utility of agricultural societies, called for by your resolution, I suppose, I may be permitted, as there is a close connection between them, to speak of the prevailing defects in agriculture, and to point out what I may consider the remedy. This branch of the subject is of the first magnitude, whether taken in a physical, moral, political or national point of view. To know the defects in the present systems, and to ascertain the remedies constitute the main ends for which our association was organized.

I will proceed in the first instance to speak of the advantages resulting from the formation of agricultural societies, their objects and utility; next the importance of the agricultural profession, compared with other professions; and then point out some of the material defects in the systems of agriculture, and recommend a remedy.

With regard to the objects and utility of agricultural societies, it may be observed, that they have a tendency to excite greater interest in improvement; to bring together the agriculturists of the country, thus enabling them to compare their views, so that the information possessed by one, may become common to all. It is the formation of a joint stock company, the dividends of which, are to be drawn in the shape of increased knowledge on the great and interesting subject of agriculture. By your constitution, an annual contribution is to be made to the fund of practical information. From that valuable clause in our constitution, requiring from each member an essay on some subject, connected with agriculture, I expect to receive much benefit, and that the public will be laid under heavy obligations. Let this requisition be strictly complied with, and much good will result, not only to the members, but to their neighbors and to the county. It is a notorious fact, that when one person begins to improve in any neighborhood, others speedily see its advantages, and are excited to follow his example. In those different essays required of your members, we shall not only have theory, but practice. Thus each one pays his instalments into the common stock, and meet together and draw their dividends in a compound ratio as one to the whole number: this cannot but be profitable stock. The dividends which we shall draw, will be more than equal to the requisitions made upon us; then this ought to be a sufficient inducement to make us all punctual in paying up our annual instalments. In a multiplicity of counsellors there is wisdom. The wisest and most profitable agriculturist amongst us, will receive a large dividend in the increase of his stock of information. No individual possesses as much information as is diffused through the whole number of members; here, then, are some of the benefits resulting from the formation of agricultural societies. But these are only a part of the advantages connected with agricultural associations. I might specify many others: the cattle show, connected with them, will certainly have the effect of creating a spirit of improvement in the breeds of cattle. Of all animals, the cow is perhaps the most valuable, whether considered in reference to the milk, butter and beef with which our tables are supplied, or in reference to the valuable labor performed by the ox upon the farm, or in carrying its produce to market. And after he has performed his full quota of service on the farm, when put into the stall, he is even then more valuable than ever.

This, then, is another important advantage of agricultural societies. I might continue to speak of improvements in all the domestic animals that are useful to man, the horse, sheep, hogs, &c.; the improvement in which, is intimately connected with the objects of agricultural societies.

But I will pass on to notice, in the next place, the importance of the agricultural profession, compared with other professions.

Gentlemen: the subject to which I am about to call your attention, is of momentous interest. The agricultural profession is of more importance than all others. It is the profession from which all others receive their life and support. It is like the main spring in a watch, which puts the rest of the machinery in motion—it is like the main artery in the human system, which pervades and gives life to the whole animal constitution: it may be compared to the spinal marrow, which, if broken, causes the decay of the whole system. The lawyer, the physician, the merchant, the mechanic, and divine, all receive support from this profession.

Behold! the seas covered with shipping, and their sails spread to every gale—all set in motion—all supported by the agricultural profession. Then can we not, ought we not, to feel a deep interest in elevating this profession to its proper rank? Can there be one spark of patriotism burning in the breast of that man, who would be unwilling to contribute his humble mite to the advancement of this great and important interest? Cold and selfish must be the heart of that man, destitute of a single glow of patriotic fire, who would be unwilling to step forward and contribute to the elevation of this important profession.

As Swift says, "and he gave it for his opinion, that whoever could make two ears of corn, or two blades of grass, to grow on a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together."

Gentlemen, this great and important interest has been kept in the back ground too long. It has been a hewer of wood, and a drawer of water to other professions long enough. It is time that it should shine forth in all its beauty and strength, and be elevated to its proper stand in society. The main spring should not be considered inferior to the other parts of machinery to which it gives motion. Destroy and break down the agricultural profession, and all other professions will languish and die. That there is a great evil prevailing, and which calls loudly for a remedy, must be apparent to every reflecting mind. Why is it, that there is so little interest felt for improvement in agriculture? Is the field not wide enough? Is there not room enough to give full scope to talents and genius? Is it unworthy of talents of the first order? Surely in this field—on this great and important subject, all the talent and genius, all the noblest faculties of man, might be brought into lively exercise, and have full scope to be useful to themselves and to mankind—in considering the plants of the field, studying the properties and qualities of soils, the best mode of improving and applying manures, and in imparting their information to others and exciting a greater interest in improvement. Such an employment cannot be unworthy of any man.

Gentlemen—that there is something wrong must be apparent to every intelligent mind—that there is a fatal disease prevailing cannot be doubted, and unless the remedy is speedily applied, will sap the foundation of this republic—the liberties that we now enjoy, for which our forefathers fought and bled, will be of short duration. Let us inquire into the nature and cause of the disease, and what is the remedy. A skilful physician, when called to visit a patient, first endeavors to find out the nature and cause of disease—being satisfied upon this subject, unless the disease is incurable, the remedy is easily applied. The principal disease in the agricultural profession, is defect in education. Heretofore, it has been considered altogether unnecessary to educate sons, whose occupation was to be that of tilling the soil. If they could multiply two by two, take one from three, and write their names, this was all that was necessary. Of late, some little more interest has been felt on the subject of education, but still there is great deficiency. The agricultural community must be enlightened, must be educated, to enable them duly to appreciate liberty, and the blessings that flow from our happy form of government. I would say, educate your sons for the farm, instead of making professional men of them. In the common acceptation of the word, *professional* is intended only to apply to law and medicine, in which sense I use it. But agriculture is as much a profession as any other calling: in this sphere they can be useful to themselves and to society.

The professions of law and medicine in this country are already overgrown. Many who fill them are mere drones, hangers-on upon society, without any, or but little, business; and of course the temptations to idleness, vice and their consequences, are of fearful character. No greater evil can befal any community than to have those professions overdone. It has been the prevailing practice in Virginia, if a man had a son that he considered a tolerably smart fellow—and most parents are inclined to give their children more credit for cleverness than they are entitled to—why, he is such a prodigy that he must be a lawyer or doctor! Most mistaken and ruinous notion! Educate those smart sons of yours for the farm; they can be clever fellows here, as well as in the practice of law or medicine; they can be as useful in this sphere as the other. By pursuing this course, you will elevate the agricultural interest. It may be thought by some, that I am opposed to other professions, that I am disposed to detract from, and to disparage them. Not so; they are valuable and useful to society. But all cannot live by the professions of law and medicine, and the thirst for those professions ought to be checked. I again repeat, I have no intension to detract from those professions; my only wish is, to exalt the agricultural profession.

Gentlemen—the seat of the disease lies in defect of education; let us attack it at its root; the remedy must be applied. Love of country, love of morality, love of our blessed institutions, all demand it of us. Then let us be up and a doing; we have rested on our oars long enough. Educate your sons as farmers—agriculture is as much a science as any of the other professions. Is it possible that any man can be acquainted with the different qualities and properties of soils; tell the constituents of which they are formed, unless he be an educated man? Can he be a judge of the most advantageous mode of applying manures—tell what kind of manure is best adapted to the improvement of different soils? Certainly not. The soil is as variable as the faces of men, and requires different modes of cultivation. I again repeat, that it is all important that agriculturists should be educated, and in this way the profession will be exalted. Knowledge is power—and if the farmers of the country were educated, the profession would take that stand in society, to which its importance justly entitles it.

The remark was used by the illustrious Jefferson in the trying times of 1798 and 1799, in a letter, if I mistake not, to Wilson C. Nicholas, that the only thing to save the country, and bring the government back to its original simplicity; to the spirit and letter of the constitution, was to fill the offices of the country from the agricultural interest, to lay aside those who were politicians by trade. It is all important that agriculturists should be enlightened, educated men; it is the only way by which the liberties that we now enjoy can be perpetuated. Let your farms be cultivated by educated men, and the blessed institutions in which we now rejoice, will remain as long as time endures. It is important that the agriculturists of the country should be educated, that they may be able to scan with a jealous eye the actings and doings of their leaders, their politicians in high places—calling no man master, suffering none to think for them, but in every case, being qualified to form opinions and act for themselves. Let this be done, and all will be well. Your sentinels may stand on the watch tower until generation after generation shall have passed away, and still continue to re-echo "*All's well! All's well!*"

Why should the great and important agricultural interest be held secondary to other professions? It is easily answered—it is in the defect and want of education.

It is certainly true, that if you educate and thereby elevate the agriculturist, there will be less use for some of the other professions; less use for physicians and lawyers. This would certainly be a benefit to the public, and in this way, and this way only, would I wish to affect those professions. If I possessed talents equal to any man that lives, or has lived, I would be willing to exert them all in endeavoring to arouse my countrymen from their slumbers, to a spirit of education and improvement in agriculture. Let the minds of the agriculturists be improved, and improvement in agriculture will as necessarily follow as that an effect will follow its legitimate and efficient cause. It is a lamentable fact, that the improvement in agriculture is advancing with but slow progress. Improvements are rapidly being made in the mechanical arts and sciences, whilst it appears that the agricultural interest is fast asleep. In passing along the highways through the Old Dominion, the land of Washington, Jefferson, Madison, and a host of other sages; the gullied hills and piney old fields become visible to the eye in every direction; the bad management of the fathers, compelling their sons to fly from the land of their birth, which promises nothing but poverty and want, to the far west in pursuit of fortune and fame.

The spirit of emigration is now raging to a fearful extent. Many of Virginia's most talented and enterprising sons are losing their attachment to the homes of their fathers, to the spot that contains the ashes of their friends, flying to other lands in pursuit of a more fertile soil. Unless a greater spirit in improvement can be excited in the minds of our countrymen, Virginia, proud Virginia! the mother of us all. the name which of itself gives passport, and in every clime, commands respect, will continue to decline and lose her political weight as a member of the confederacy.

I am well aware that the views I have taken in favor of agricultural education come directly in contact with the prejudices of a large number of persons. There is a prejudice prevailing against what is called book farming, book knowledge. This is a mistaken notion and shows to what extent man can be carried by prejudice: and in connexion with this I will relate an anecdote—a farmer of our county, a worthy citizen, remarked not long since, "there were some things he disliked more than all others, to wit: *The Farmers' Register* and blind ditching."

Is not most of our knowledge derived from books? Agriculture is as much indebted to the arts and sciences, as any other profession. Deprive the agriculturist of the benefits derived from these sources, and your common implements of husbandry will be taken from you.

It has been frequently argued, that it was unnecessary to educate the agricultural profession, and often particular persons who are uneducated, and who have been successful in agricultural pursuits, are pointed out to prove the proposition. Can any thing be more fallacious? Is this conclusive testimony, or rather does it prove any thing? It only proves that such men are gifted by nature with strong and powerful minds, enabling them to rise superior to the disadvantages under which they labor, and does not prove that their success would not have been still more signal. I have no doubt, that all such feel, and sensibly feel, that they labor under difficulties which education would have removed.

Improve the mind;—this is first in importance, and the improvement of the soil, and improvement in all the various branches of agriculture, will follow as a necessary consequence. I have already probably consumed too much time on this branch of the question. I will pass on to the consideration of the improvement of the soil.

In presenting this subject, many things are to be considered. The first in importance is a good foundation. A red clay foundation is considered the best. This being obtained, good teams, ploughs and other implements of husbandry must be had. Land may be much improved by good ploughing. Deep ploughing is all important, mixing a portion of the clay with the mould, thereby increasing the depth of soil and its fertility. This may be carried too far upon thin soil. The depth of ploughing should be regularly increased, and not much clay turned up at one time. Very much depends on the proper draining of land. Nothing is more ruinous to the productiveness of land, than suffering the water to lie on it and causing it to become sobbed. The abominable three-shift system, so well calculated to impoverish and destroy the soil, is now growing into disuse with intelligent and practical farmers, experience having proven that it was ruinous both to the owner and to the soil. This practice may answer on James River bottom, but I doubt if there will not be a regular falling off in such land and its products. I am not able to speak from experience, and much the larger portion of agriculturists, being owners of high-land farms, my remarks are intended more immediately to apply to such. A number of persons are now practising upon the four-shift system. This is rather better, and in the hands of skilful managers, the soil will receive some improvement. But to this system I have many objections;—I am in favor of the five-field system, and consider it the very best that could be adopted for this section of the country.

In order to improve to advantage, you must have good teams. There is great want of management in this one particular. Let your teams be increased, and the number of laborers may be diminished. There are very few farms that have sufficient teams. From my own observation, combined with practice, I would say, there should be a good horse or mule or a yoke of oxen, to each hand. The five-field system that I am about to recommend, will require this proportion of animal labor in order to operate to advantage. If every farmer now cultivating upon the four-field plan, would divide his farm into five-fields, and adopt the following course of cultivation, I have no doubt his profits would be greatly increased, and that his land would improve much faster.

Take a farm, say 400 acres; lay it off in five fields, of eighty acres each, No. 1, 2, 3, 4, and 5. The number of laborers and teams required on such a farm, will be about twelve hands, seven or eight men, the balance women or boys; eight good horses or mules, and four yoke of oxen. Your farm being divided into five fields, of eighty acres each, commence, say in 1835 in No. 1; manure in this field from 16 to 18 acres for tobacco; the remaining 62 or 64 acres put in corn. Immediately after harvest, and whenever the land is in suitable condition for fallowing, put all your teams to that business, and fallow No. 2 for wheat. In the fall, 1835, sow No. 1 and 2 in wheat. In the spring, 1336, say last of February, or first of March, sow No. 1 and 2 in clover. From the 1st to the 15th April, sow half a bushel of plaster per acre on the young clover just up in No. 1 and 2. This will enable the young clover to stand the drought of summer. One gallon of clover seed per acre is usually sown. In 1836 manure the same quantity in No. 3 for tobacco, and put the balance in corn, fallowing No. 4 for wheat. Fall, 1836, sow No. 3 and 4 in wheat. Spring, 1837, sow clover in No. 3 and 4, and plaster, as in No. 1 and 2. The clover in No. 1 and 2 being now 12 months old, sow the same quantity of plaster as last spring. This year the clover in No. 1 and 2 rises to perfection, till which time, you should graze as little as possible.

Permit me to digress a little, and recommend to every farmer and planter to reduce his stock. Have as little as he can possibly do with. You cannot improve land with an overgrown stock. It is useless to sow clover and plaster; it is throwing money away, if you permit the clover to be grazed off. Make your land rich first, and your stock may be increased, and a profit received from them.

I had proceeded as far as No. 4 in the system I was recommending. In 1837, manure in No. 5 for tobacco, as in No. 1 and 3, and put the remainder in corn. Fallow No. 1 for wheat, being a good clover lay. Seed No. 5 and 1 in wheat in the fall, 1837. Spring, 1838, sow clover and plaster on No. 5 also, half bushel of plaster per acre on No. 3 and 4. It will be unnecessary to sow clover seed this spring on No. 1; it being a clover fallow, enough will have been turned in to insure a crop; and having come under to No. 1, clover fallow, you will now begin to see the benefits of this system. You will find that the additional crop from No. 1, will pay a good per cent. upon the expenditure—indeed you will discover that it was money lent at usury; and discard at once and forever the idea and excuse used by so many persons, that you are not able to sow clover and plaster. You will then find, as I have done, that your interest will not permit you to dispense with its use. You will perceive, that by practising upon this system, you will have three-fifths of your land in cultivation every year; one-fifth in corn and tobacco, two-fifths in wheat, and the remaining two-fifths in clover, rising to maturity. You will therefore have three crops from each field in five years—one of corn and two of wheat. You will have each year one hundred and sixty acres in wheat, and eighty acres in corn and tobacco, say 16 acres in tobacco, and 64 acres in corn, the balance, 160 acres, in clover—never raising tobacco two years in succession upon the same land.

If you should farm it entirely, a farm of the size before stated would not require as many laborers by one-third; in every other respect, the course would be the same, simply dispensing with the tobacco crop. Compare this system with the four-field system: farm 400 acres, four fields, 100 acres each, No. 1, 2, 3 and 4. On this plan you would be unable to fallow for wheat; demonstrated thus: 1835; No. 1 in wheat, fallow No. 2; fall, 1835, sow No. 1 and 2 in wheat; spring, 1836, sow 1 and 2 in clover, corn in No. 3; fallow No. 4; seed No. 3 and 4 in wheat. In 1837 you would have to plough under young clover in No. 1 for corn; consequently the land would receive no benefit, the clover not having risen or come to maturity; and so it would be every year afterwards. Under this plan your profits would be less, and the land receive but little, if any improvement. If you grazed at all, you would destroy all your clover. Your crops of wheat would be greatly diminished, having under this plan only 100 acres in wheat, and that corn land, or corn and tobacco land. Under the other system, you would have 160 acres in wheat; 80 clover fallow; 16 or 18 tobacco land, and the balance corn land. Clover fallow will double corn land upon an average in wheat. The crop of wheat from the 160 acres will more than double that from the 100 acres. Take a tract of land of 800 acres; divide it into two tracts of 400 acres each; place two farmers equal in management, one on each, one pursuing the four-field system, the other the five, and without any hesitation I would say, that in less than ten years the profits of the five-field farmer would exceed that of the other at least one-third—their capital being equal when they commenced. The great secret as to the best mode of improving lands, although an extensive subject, may be expressed in a very few words. First lay off your land into a sufficient number of fields, use clover and plaster freely, plough well graze but little, raise as much manure as possible, and apply that judiciously.

Pursue this course and your land will be improved, and your purse be filled. The cost of this system is as follows: one gallon of clover seed, average cost 75 cents; one bushel of plaster, half bushel first and half bushel second spring after seeding clover, average cost a little less than 50 cents, say 50 cents, added to cost of clover, make $1 25 per acre—the whole expense. Such land as had usually brought eight bushels to the acre, would bring an increased crop of from four to six bushels, from the first clover fallow, and a regular increase afterwards—the system being kept up. Here then the expense is $1 25 per acre; increased crop from four to six bushels of wheat per acre, say four bushels at $1 per bushel, is $4; take off the expense, $1 25, and you have a nett profit of $2 75 per acre, a little upwards of 200 per cent. on the expenditure. This is not at all, your land is in much better condition, being in a rapid state of improvement. You will also have received considerable benefit from grazing and clover hay.

Gentlemen, this is no theory, no book knowledge: make the experiment, and give it a fair trial, and you will more than realize all that I have stated. There are many other points that deserve consideration—the best way of preparing land for the reception of seed, management of stock, &c., but I fear I have already descended too much into detail for an agricultural address, and that it has more length than interest—but the great interest I feel in the cause, is my apology.

From the Newbern Spectator.

A PROPOSITION TO EXCLUDE ANONYMOUS WRITERS.

[It is a rare occurrence for us to quote any remarks of our editorial brethren of the *political* press, unless relating more to our department than to theirs. The following proposition, however, though designed for political newspapers, if adopted, would have effects of uncalculable amount and value on the morals and the interest of our country at large.]

"The editor of the *Newbern Spectator* (says the People's Press,) proposes that the editors in this state "*close their columns forever against anonymous writers.*" This would prevent the indulgence of a rancorous spirit through the newspapers; and although some disadvantages would attend it, in preventing the modest aspirants for literary fame from making their debut, yet as a whole it would be far preferable to the present system. We say *aye* to the proposition."

We are pleased to see that our proposition meets with favor, and we thank the independent Editor of the "Press" for his support. There can be no more doubt that editors will feel relieved by the adoption of the rule, than that the journals of the state will be rendered more dignified, moral and efficacious. All of them must have felt the disagreeable necessity of offending acquaintances by rejecting communications that had no other ends in view than the gratification of the writers' embittered feelings, and the mortification of those of their opponents; and all of them must sometimes have felt, as we have often done, extremely chagrined to see columns of insipid, ungrammatical, and prosing stuff presented to their readers by anonymous *savans*, which delicacy forbade them to reject, though they well knew its worthlessness. All this "gnashing of teeth" will be avoided by the establishment of the rule which we propose, viz., to admit nothing which is not subscribed with the real name of the author, and only as much of that as we shall deem worthy.

What say ye, Registers, Recorders, Stars, Suns, Watchmen, Examiners, Heralds and Journals? Will you aid in this effort to retrieve the character of the press of the state?

For the Farmers' Register.

RAIL ROADS IN VIRGINIA.

The first rail road undertaken in Virginia, was from the coal mines in Chesterfield to tide-water, opposite Richmond—a distance of twelve miles. On the completion of this, about five years ago, the stock advanced to more than 50 per cent. premium, and a large portion of the capital has been re-funded to the stockholders, exclusive of the payment of interest on the investment.

The second undertaking was on a much more extensive scale, and its success was considered, at the time, very problematical, as it had not the advantage, like its predecessor, of the certain transportation of a vast mineral product, but was dependant on that of agricultural produce of foreign goods in return, and of passengers. This work was the Petersburg and Roanoke Rail Road—61 miles in length. It was steadily persevered in, and struggled through the difficulties attendant on new undertakings, but was completed in about two years at an expense of $600,000—including ample means for transportation, and has divided 10 per cent. annually. The tardy movement of three or four days by wagons, was thus reduced to five hours, and the expense diminished more than one-half. The termination of this road on the Roanoke, is at the village of Blakely, immediately below the falls of the river, and from whence, it is navigable for steam boats to Albemarle Sound. The prospect of success exhibited by this work, caused a rival one to be undertaken, before the former was completed, commencing at Portsmouth and to terminate at Weldon on the Roanoke. This work has been about three years in hand, and is advancing to completion.

A third work, (called the Greensville and Roanoke Rail Road, eighteen miles in length) terminating on the Roanoke, about fifteen miles above, the first, (at a point recently honored with the name of Gaston,) avoiding the great falls of the river between that place and Blakely, and connecting with the Petersburg road near the village of Hick's Ford, is now in active progress, and will be completed during the ensuing year.

From Gaston the line of rail roads can be continued on the great mail route to Raleigh, and thence south, to Columbia, and west, into the interior of North Carolina, if the legislature of that state will foster such undertakings.

Retracing our steps to Petersburg, we find a a rail road about to be constructed from thence to Richmond, 20 miles; of the successful and speedy prosecution of which, there is no doubt.

From Richmond a great work is now in rapid progress, extending north through Fredericksburg to the Potomac 70 miles, and thus completing an entire line from north to south through the state of Virginia. A branch from this road westwardly is projected to Taylorsville and Charlottesville—through a rich and fertile country.

The stocks of the Petersburg, Greensville and Potomac roads all command a premium, and that from Richmond to Petersburg will be readily taken so soon as the charter shall be obtained.

Turning our view west, we find the Winchester and Potomac Rail Road, of about 35 miles nearly completed, and an extension from Winchester to Staunton (say 90 miles,) about to be commenced. A reference to the map will show that these will form an uninterrupted communication from the latter place to Baltimore.

Among the works now contemplated, are a continuation of rail road from the several points of termination already mentioned on the Roanoke, by Milton and Danville to Evansham in Wythe county—thence, as a matter of course, to the line of Tennessee. A rival to this is projected from Lynchburg to Evansham, Abingdon, &c. Both are splendid projects, and either of them would form an extended arm toward a connection with Nashville, Mobile and New Orleans.

Last, but greatest in extent, is the work now commenced by a canal and rail road from Richmond by Lynchburg to the navigable waters of the Kanawha and Ohio—an undertaking, toward which, the commonwealth has engaged to contribute its million, and which, when completed, will be second to none in the union.

R. R.

EXTRACTS OF PRIVATE CORRESPONDENCE.

[Though in this puffing age—when editors of periodicals not only accept and repeat, but beg, buy, exchange, and manufacture the most fulsome and disgusting puffs of their works and of themselves—when the most exorbitant of the trade bring together, and republish regularly, all the puffs that they have procured by these various means—still, as holding in deserved contempt these acts of meanness and fraud, we may need the indulgence and pardon of our readers for exhibiting such extracts as some of the following, however different may be the motives which have actuated their writers, from those who make and publish puffs as a part of the regular pecuniary business of publication. But besides the vast difference of persons, and of motives, there is a general remark applicable to these extracts from the private letters of our correspondents which serves to qualify their expressions, and to excuse their being here introduced. The writers of these pieces (and of many others which we have suppressed, because conveying nothing but mere applause,) seem to *personify* the Farmers' Register, and to address to its editor the testimony of approbation which all its contributors have a right to share, and of which but a small portion belongs to us individually. This general correction, or substitution of names, being understood, it may be permitted to publish expressions of approbation, which, on account of the sources from which some of them proceed, deserve to be highly prized by every contributor who has added something to the reputation and usefulness of the Farmers' Register.]

Halifax, Va.,———

I cannot permit this opportunity to pass without expressing to you the pleasure and profit which I continue to derive from your labors. I was at first fearful that the subject would be exhausted in six or eight months, but it appears to expand in your hands, and I now verily believe, that if you reach the age of four score, and continue diligent, you will hardly be able to correct all the abuses and ignorances which beset the noble science of agriculture. You have called forth a spirit of improvement in the Old Dominion; you have infused life into a dead body, and should you now drop your pen and sleep—you will pardon me for saying, that I know of no man who even then could say, that "*I* have done more service to the state." * * * *

In this section of the state our system of tillage is not quite so barbarous as it once was, but still it is wretched. The spirit of emigration here is entirely at war with the spirit of improvement. Men constantly say, "Why improve? I am going in a short time to the west." Others again, "My land will support me as long as I live, and my children will, as soon as they are of age, *go out*." Now if men would wish to improve, and would seek for information, there would be some hopes of the country; but when they flatly tell you they care nothing for it—what can be done? Argument and exhortation are thrown away, and one is almost tempted to despair of the Old Dominion. If any thing can be done to dispel this frightful lethargy—you are the man to do it. Go on, sir, and do you at least not despair: for so soon as you give the cry of retreat "*sauve qui peut*," there will be a general rush to the "land of milk and honey," and your humble servant among the rest. Persuade every body to live in this country, and to make the country worth living in. May you succeed.

Westmoreland, Va.,———

I cannot refrain from expressing the great pleasure I have already received from the perusal of the 1st Vol. of your paper, and I feel satisfied if its circulation could be more widely extended in our Northern Neck, that in a few years our section of country would wear a very different aspect, and our lands, instead of being a "drug in the market," would assume a value equal, if not superior, to any in the state. It will no doubt be gratifying to you to learn that since your periodical found its way into this neighborhood, an interest has been excited on the subject of improving our lands, which is likely to be productive of important results. I know several farmers near me who have had their farms divided for years into two fields, and until the appearance of your paper, had perhaps never thought of improvement, beyond the covering of two three acres with farm-pen manure, have now divided their farms into four fields, and have commenced using lime and clover to a considerable extent. Others again who are not prepared to go fully into the foregoing system, are making experiments in the small way, by cutting off lots, making standing pastures, hauling out sea ore (which had been neglected for years,) and the like. In short, sir, I think we are on the very verge of a new era in agriculture; and, if I am not greatly mistaken, the face of our country in ten years will wear almost as different an aspect, as did the village of his nativity to Rip Van Winkle after his sleep of twenty years. * * *

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King & Queen, Va., March 26th, 1835.

I consider the Farmers' Register a most valuable work, and particularly the three or four first numbers, which induced me to divide my farm into four shifts, under which system it is improving most rapidly; and whenever I can get clover to stick, I shall think the work done. However, peas are not much inferior to clover, and will grow on almost any land. When "laying by" my corn, which I did with cultivators, I sowed peas on several acres: and when they were beginning to bear, I turned them in with a double plough—and I am sure the wheat would not have looked better had I used the best manure.

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Pendleton, S. C., Aug. 17, 1835.

I am in hopes the permanent success of your paper is ensured by a liberal patronage. It should be in the hands of every planter who wishes to keep up with the rapid improvements now making in agriculture, or profit by the experience of those who have wasted much time, experimentally, in obtaining their results. But it is a striking fact, that those who constitute the largest, as well as the most solid portion of society, should be so indifferent to their interests as to exclude periodicals, whose pages are crowded with matter calculated to cast a flood of light upon their pursuits, whilst their names contribute to swell out the list of the numerous journals, self-styled "Literary Emporiums," but whose columns are the receptacles of subjects "light as air."

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Caroline, Sept. 16th, 1835.

The Farmers' Register has rendered, and is doubtless rendering to the farming interest, a most essential service. Your treatise on calcareous manures, followed by the Register, has (I have sometimes thought) brought about a new era in agriculture—at least in Eastern Virginia. Farmers are rapidly imbibing the important doctrine that a *considerable outlay* of capital in the improvement of their lands is not at variance with immediate profit in husbandry—a principle in husbandry, which if established and fixed in the agricultural mind as correct, is admirably calculated to assist in the resuscitation of old Virginia. For could the people be brought to believe in the practicability of a general improvement of their farms without a too great annihilation of profit, a degree of contentment (I imagine) would thereby be attained, which would greatly check the present fearful drain of population and capital from our state. Indeed, I am induced to look upon it, as calculated to prove, eventually, one of the most salutary and effectual checks to emigration. May your valuable labors in this, and many other respects, be crowned with great success.

Much has been said in favor of both the three and four-field systems, without enabling the farming community to arrive at a definite conclusion touching the matter. From all that I have seen on the subject, and reflection bestowed, I am induced to think the three-field system suits all such sections peculiarly well suited to the production of corn, and the four-field, those which suit wheat; for when the unsuitableness of lands to the wheat crop is considered, in connexion with the great uncertainty of that crop, farmers in corn sections are loth to depart from the old three-field system.

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Pendleton, (S. C.,) Oct. 8, 1835.

Absence from home and my numerous engagements, prevented me from perusing the supplement to the Register, and the No. that accompanied it, till within the last few days.

I read them both with pleasure and instruction, particularly the former. Your remarks and experiments on calcareous manures are highly interesting; and as a southern planter, I tender you my thanks for the benefit that you have already conferred on lower Virginia, and which I doubt not, will ultimately rescue from poverty and wretchedness, not only that portion of Virginia, but all of the corresponding portions of the southern states.

In reflecting on our future prospects, nothing has caused such melancholy feelings, as the steady progress to sterility, which has followed our southern agriculture from the first settlement of the country. It must be arrested, or the doom of the southern race will be the most wretched that can be conceived. A universal debasement, morally and intellectually, must follow. To arrest such calamity, you had the honor of making a great, and successful effort—and that on the very spot where the evil first commenced, and which had produced its worst effects. I trust your example will induce others in different portions of the south to follow in the same patriotic course, till the evil shall be entirely arrested. It ought to be a principle of morals and patriotism, as well as of individual economy with us, that no gain is legitimate that does not leave the land as productive as it was before it was taken.

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Prince George, Nov. 17, 1835.

I should be glad to see, from some intelligent correspondent, a communication on the Hessian fly, with a *very* minute account of its habits. There are few more interesting subjects of investigation; and a patient and scientific observer might produce results of great consequence in a national, as well as individual point of view. I should also be pleased to get some information relative to the *vi-*

rus of the St. John's wort, and the best methods of relieving animals that have been affected by it. Its specific action on the white spots [of cattle] only, or at least mainly, is somewhat remarkable. I have this year heard much of the ravages of the fly—so called *par eminence*—and have in some measure experienced them. I am now re-sowing some of the places that were most injured.

An acquaintance has lately assured me that his sales last year, from a farm, which originally cost him but $3,500, amounted to $3,600! How many emigrants would this hurry off, if told of a *new country*. You will perhaps guess that I refer to Mr. ————.

From the Cultivator.

INFLUENCE OF THE STOCK ON GRAFTED FRUITS.

On a recent visit to a friend in Hartford, Conn. we had occular demonstration of *the influence of the stock upon the fruit.* Our friend had in his garden a pear tree bearing large summer fruit, which ere it was ripe became rotten at the core. The fruit being consequently worthless, he engrafted the St. Germain pear upon several of the side shoots, and the Vergalue upon the top. The effect has been, to enlarge the fruits last grafted, and to accellerate their ripening at least a month. The St. Germain, of which we took several, are of double the size of those grown on the tree from which the grafts were taken; the Vergalue is somewhat increased in size, though deteriorated in quality, and one of the fruits which we ate showed a partial rottenness at the core. The effect of growing butter, or melting pears, on the quince, a practice general in France, is to impart more solidity to the flesh. These facts may become important, as they seem to suggest a new means of crossing fruits, by which the maturity of those that ripen too late for a northern climate may be accellerated; and those which ripen too early for winter use may be retarded in their maturity. The grape affords a good subject for experiment; and the Isabella, Catawba and Blands, may thus be brought to ripen their crops with more certainty and in greater perfection among us.

[This report was prepared for our last No., but having been delayed on its passage, did not arrive until the last sheet was printing off. As the contents apply to the commercial transactions of the whole preceding year, the value of the report is not materially impaired by the delay of publication.]

For the Farmers' Register.

COMMERCIAL REPORT FOR OCTOBER.

The inspections of tobacco in Virginia, the exports of that article, and the stocks on hand at the expiration of each year, ascertained to 1st October, were as follows:

Year.	Inspections.	Exports.	Stocks.
1832	36,446	26,614	11,950 hhds.
1833	34,250	19,783	12,350
1834	35,600	25,300	10,600
1835	47,000	25,919	15,600

The exports of the year ending 1st instant, may be classed thus—

To London	6,854 hhds.
Liverpool	6,924
Bristol	1,290
Glasgow	674
Leith	283
New Castle	192
Havre	3,689
Bordeaux	300
Marseilles	150
Gibraltar	250
Antwerp	400
Amsterdam	30
Rotterdam	758
Bremen	1,077
Cowes, &c. for orders	2,943
West Indies	111

About 16,000 hhds. were manufactured in the state or shipped coast-wise.

Although the inspection was so large, the demand has been sufficient to meet the increase, and prices are well supported. Scarcely any of the old crop can be purcased at less than $6; and all prices are paid up to $12½ per 100 lbs. according to quality.

The apprehension of frost at the close of last month, and its actual prevalence in the early part of this, caused the planters, generally, to cut their tobacco in a green state, and of that which was left in the fields, the greatest portion was killed. So large a crop had, however, been planted, that an average product may be expected—though the quality will prove very inferior. The crop in Kentucky and Tennessee is reported to be larger than in any former year—that of Maryland very small.

The quantity of cotton received in Virginia during the year ending 1st instant, was 33,000 bales, being 11,000 less than in 1834. The crop of the United States for the last ten years, has been—

1824	560,000 bales	1829	977,000 bales
1825	710,000	1830	1,039,000
1826	937,000	1831	987,000
1827	712,000	1832	1,070,000
1828	858,000	1833	1,205,000
	The crop of	1834	1,254,000 was

thus disposed of

Exported to Great Britain	722,700
France	252,400
Other ports	48,390
Manufactured in the U. States	217,000

The quantity received in the different markets during the last three years is stated thus—

	1833	1834	1835
New Orleans	403,500	454,700	511,100
Florida	23,600	36,700	52,100
Mobile	130,000	150,000	198,000
Georgia	271,000	258,600	222,700
South Carolina	182,000	227,300	203,200
North Carolina	30,300	33,200	34,400
Virginia	31,000	44,700	33,200

The great annual increase in the culture of this article baffles all calculation as to injury sustained by the crop. The last, which was supposed to be smaller than the previous one, from the unfavorable season in 1834, proves to be 50,000 bales more; and the crop of the present year is estimated at 1,400,000 bales.

It is unreasonable to expect that high prices can be supported under such an increase of cultivation; and the markets in Europe and this country have been gradually declining for some time. New cotton now commands 15 cents, but it is expected to fall as the season advances. The quality is said to be unusually good. In Virginia the crop was diminished by frost, also in North Carolina—but not south of that.

As the season advances, it becomes more manifest that the wheat crop in Virginia and North Carolina was very short. The mills have not ground half their usual quantity—are without any stocks of wheat, and will be compelled to remain idle a great part of the season. Red wheat sells at $1 30, and white at $1 35 cents. Country flour $6 25. City Mills $7. There was exported from Richmond, direct to Brazil during the past season, 62,000 barrels flour. Exchange on London 9¼ premium.

Oct. 28. X.

COMMERCIAL REPORT FOR NOVEMBER.

Your correspondent regrets that he should have caused any disappointment to you last month, by the delay of his communication. The statistical details it contained may be useful to some persons, for future reference, and if you think proper to publish them at this late period, the present report need but notice the slight variations which have since occurred.

A momentary excitement in the wheat market, which arose from no other cause than competition among the millers, advanced the price of wheat for a few days to $1.40, and even higher. The unprofitable contest soon, however, subsided, and the price receded to $1.30 to $1.33 cents for red, which is now the quotation. As no other than City Mills flour commands more than $6.50 per barrel, the millers can make but slender profits, if any. It is remarkable that in no other markets in the United States, has the price of wheat been so high this season as in Richmond and Petersburg. This may be ascribed to the great deficiency of the crop. Several cargoes of wheat have been imported into this country from Europe, and some flour which had long remained unsaleable in England has been returned to the United States.

The receipts of cotton in the Virginia markets since the first of October, have been very small—about 5000 bales in Petersburg, and less than 1000 in other places. It has all met a ready sale, and at advanced prices, while in all the northern and southern ports there was a decline. From 15 cents, which was current a few weeks ago, the price has gradually risen in Petersburg to 15⅝ cents for good new cotton. In New York during the same time it has declined 1½ to 2 cents. The reported injury by frost in Virginia, and a large part of North Carolina is confirmed, reducing the produce of the portion of country where it prevailed, to about the same as last year—if not less. In north Alabama and part of Tennessee, the diminution is said to be one-half. In other portions of the country it was more or less felt, but still the increased cultivation in the west is such as to induce a belief that the crop of the United States will not fall short of 1,350,000, and may reach 1,400,000 bales. Should this estimate be realized, the inference is that the prices must decline.

Since the frost in the early part of October, the temperature has been that of summer, with the exception of one or two days, until the present time, and but for that early frost, the crops of cotton and tobacco would probably have been so large as to overstock all markets.

Tobacco continues in good demand at high prices. Of the old crop about 1500 hogsheads, or less, remain for sale, and several thousand hogsheads are held by shippers, or in course of shipment. Old may be quoted $6.50 to $12. Of the new, the receipts have been confined to the lowest quality, (lugs, primings, and partly frost bitten,) which sells from $5 to $6.50, and to loose tobacco, not perfectly cured, embracing crops round at $7 to $8. The early cuttings, previous to the frost, will furnish a portion of good and fine quality, but the great mass of the crop it is thought will prove very inferior.

It is stated that the French government intends to restrict the cultivation of tobacco in that country to a smaller quantity than heretofore, if not to prohibit it entirely, and also to change its system of obtaining supplies of American tobacco. That it will make contracts for future delivery to correspond with the samples exhibited, not confining its purchases to fine quality, leaving it open to all persons to make tenders. Should these statements be confirmed, the interest of the tobacco growers in the United States will be promoted, but it would be more desirable to have the trade in this article unshackled, as it is in every other.

Stocks generally have declined in the northern cities, but prices there being generally governed by gambling speculations, there is no steadiness in them. The stocks of the Virginia banks vary but little—Virginia Bank 113½ to 114—Farmer's Bank, a trifle lower. Petersburg Rail Road shares have been sold at $120, including the six months' dividend of 5 per cent., payable the first of December—Richmond and Potomac Rail Road $10 premium—Greensville and Roanoke $5 to $7 premium. Exchange on England 9½.

X.

November 23.

THE BRITISH FARMER'S MAGAZINE AND THE FARMERS' REGISTER.

The British Farmers' Magazine for July contains nearly thirty two pages of matter extracted from the Farmers' Register and from the Essay on Calcareous Manures (1st Ed.) This circumstance is the more remarkable, as it is not the practice of this, or other British periodicals, to present other than original pieces, except such short extracts as are embraced in their reviews of new publications. Even to these, but little space is allowed in agricultural journals, there being rarely more than a page or two given to the review of any one work. In the two years that we have received this journal, it is not remembered that there has been a single selected article published. The present departure from previous usage, in this respect, and the fact of the extracts being so very copious, present an unusual, as well as complimentary notice of the pieces so extracted. Still, there is something to be complained of in the manner in which these articles are presented to European readers. For the first one only, "*On the influence of parentage on offspring, in breeding* *animals*,"* is credit given to the Farmers' Register, which is named as the source, and as "a highly respectable agricultural periodical, published at Richmond, U. S." By the way, our correspondent, to whom this journal was indebted for that communication, may well consider it a compliment to his theoretical opinions on this subject, that they should have been so republished in this British work, as its conductor, the Rev. Henry Berry, is one of the most judicious breeders in England, and esteemed as the highest authority on improved live stock, and all matters connected with their breeding. The next article republished from the Farmers' Register, is the translation made for this journal, from the *Journal d'Agricultural des Bays-Bas*, of Dr. Bronn's essay on "*The influence of the origin of seeds on the quantity and quality of crops.*" We have, by our comments, at several times, endeavored to attract more attention to this interesting and valuable piece, and thought it strange that it should have been so little noticed; and still more so, that the British public should now be indebted for it to our translation, instead of to the original article, as it appeared in the Belgium journal. The presenting the first *translation* of a foreign article is certainly a merit in a journal very inferior to being the source of one entirely original, of equal value: still the service is worth some acknowledgement —and not the slightest has the British journal made to our's, for this translation.

From the form in which is presented the portion of the Essay on Calcareous Manures, it may be considered as the commencement of the publication of an entire English edition. The extract embraces the whole of the first five chapters, excepting the 2nd, ("On the soils and state of agriculture of the tide-water district of Virginia," which is omitted,) and the closing words indicate that in the next No. the work was to be continued. But there is not the least editorial note, nor even the mechanical indication made by a change of type, to show that the entire article is not there original, and appearing for the first time. It will scarcely be deemed a contradiction to this assertion, that the author's name is given, followed by the letters U. S. which probably serve as little to point out locality to an English reader, as the letter N. S. W. or G. B. would to us that an author was an inhabitant of New South Wales, or of Great Britain. It is true (notwithstanding the omission of all credit to the original source, and of the preface, and of the chapter which applies more particularly to our localities,) that a diligent reader would gather from the general purport, the country whence the work was derived, and to which it was more especially designed to apply. But probably few would be induced to give so much attention to what appeared under so deceptive and uninviting a guise.

The mechanical arrangement of this No. of the British journal, would furnish still stronger ground for our charge. In the Table of Contents (printed conspicuously on the first page,) all the three articles above named, are classed under the head of "Branch I. *Original communications, &c.*" and neither of them even stands in the subdivision of that Branch, "Notice of New Publications." The "Branch II. *Agricultural Intelligence*," is devoted to subjects of quite a different character—and *selections* of entire articles, are not named, as a separate branch, and do not come within the usual range of the publication. This incorrect arrangement, however, might have been caused by the printer's mistake—and would not have been complained of, if the borrowed articles had been properly acknowledged elsewhere.

But putting aside all personal considerations, it is a subject of congratulation that this commencement is made by a British journal of the use of American agricultural opinions. In agricultural science and practice, the best informed communities, as well as individuals, may often learn something of value from the far more ignorant—and the latter may gain still more by having their opinions and and practices judged, and tested by the more enlightened. There is no department of science, or art, in which free and reciprocal communication of opinion would be more serviceable than in agriculture—and none on which there has heretofore been so little. European agriculturists, vain of their acknowledged superiority, perhaps hold all American agriculture in contempt, and as unworthy of other notice: and our farmers generally, encased in the still more impenetrable armor of contented ignorance, consider all English farming as inapplicable to us, and that nothing profitable can be learned from its study. Either country would certainly be wrong to copy fully the practices of the other in any one respect —yet either may learn much, and profit much, by knowing, comparing, and judiciously combining, some of the practices of both. Through this journal no pains have been spared to spread before our readers the best selection of recent European agricultural information—and not without some (already known) good fruits to our country; and the particular circumstances which have called forth these remarks, induce the belief that similar means of deriving information will be so made use of by our European fellow laborers, that both countries will derive from the course redoubled benefit.

SEASON AND CROPS.

Since the latter part of October, when our last observations on the season were written, the weather has been very generally and unusually warm—a few days of that time only, previous to the 24th of November, having been cold enough to be suitable to this region. Much the greater part of November has indeed been at least as warm as is usually the corresponding part of October. Of course, (and in direct contradiction to our former anticipation,) the Hessian fly has not only been destructive, to the wheat but to an alarming extent. Some land has been ploughed up and sown again.

Many farmers have already discovered that their corn was too little cured to be housed, when it was done at the usual time—and have had to throw out of their cribs the greater part, to stop the progress of mouldiness. All will need to be attentive to this important matter. This evil has not been experienced before, since the remarkable year 1816. No better proof could be furnished of the predominance, through the past summer, of unusual cold and moisture.

* *See page 193, Vol. I. Farm. Reg.*

THE FARMERS' REGISTER.

Vol. III. JANUARY, 1836. No. 9.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

TOBACCO AND WHEAT CULTURE COMPARED.

To the Editor of the Farmers' Register.

Happening the other day to take up Arthur Young's "Agricultural Tour through France," a work of great and acknowledged merit, which gives the best account I have ever seen of the soil, climate and agriculture of that extensive and fertile country, I was struck with a passage which has reference to the husbandry of Virginia—and as the work is perhaps not known to many of your readers and correspondents, and may not be in your possession, I have copied the passage, which you will publish in your Register, or not, as you think best. I know not whether you will think it worthy of a place there, but I am persuaded that it gives a lesson well worthy of the attention of our most active and judicious cultivators.

The work is divided into two parts—one a Journal of his Travels, with remarks on the agriculture, &c. of the districts he passed through; the other of the Heads or Chapters on the soil, climate, agricultural products, &c. There is one on the culture of tobacco, from which you have the following extract:—

"Tobacco, as an object of cultivation, appears in these notes to very great advantage; and a respectable author in France declares, from information, that instead of exhausting the land, it improves it like artificial grasses;* which seems to agree with my intelligence; yet the culture has been highly condemned by others. Mr. Jefferson observes thus upon it: "It requires an extraordinary degree of heat, and still more indispensably an uncommon fertility of soil: it is a culture productive of infinite wretchedness; those employed in it are in a continued state of exertion, beyond the powers of nature to support: little food of any kind is raised by them: so that the men and animals on these farms are badly fed, and the earth is rapidly impoverished. The cultivation of wheat is the reverse in every circumstance: besides clothing the earth with herbage and preserving its fertility, it feeds the laborers plentifully; requires from them only a moderate toil, except in the season of harvest; raises great numbers of animals for food and service, and diffuses plenty and happiness among the whole. We find it easier to make an hundred bushels of wheat, than a thousand weight of tobacco, and they are worth more when made."† This authority is respectable; but there are circumstances in this passage which almost remove the dependence we are inclined to have on the author's judgement. The culture of wheat preserving the fertility of the soil, and raising great numbers of animals! What can be meant by this? As to the exhausting quality of wheat, which is sufficient to reduce a soil almost to a *caput mortuum*, it is too well known and too completely decided to allow any question at this time of day; and how wheat is made to raise animals we must go to America to learn—for just the contrary is found here. The farms that raise most wheat have fewest animals; and in France, husbandry is almost at its lowest pitch for want of animals, and because wheat and rye are cultivated, as it were, to the exclusion of other crops. Tobacco cannot demand an uncommon degree of heat, because it has been cultivated on a thousand acres of land successfully in Scotland; and as to the demanding of too great exertions, the free hands of Europe voluntarily addict themselves to the culture, which has nothing in it so laborious as reaping wheat. I take the American case to be this—ill husbandry, not tobacco, exhausted the land. They are now adopting wheat; and, if we may judge from the notions of the preceding quotation, that culture will in a few years give the finishing stroke to their lands—for those who think that wheat does not exhaust, will be free in often sowing it, and they will not be long in finding out what the result will prove."

You see that Mr. Jefferson's observations on the cultivation of tobacco in Virginia, are very far from receiving the approbation of Mr. Young. Mr. Jefferson's reputation does not rest on his knowledge of agriculture; and I think it will generally be agreed, that the passage from his Notes on Virginia, quoted by Young, is at best, very loosely written—and, apparently, without due consideration of the comparative advantages and disadvantages of wheat and tobacco crops. His notion that tobacco is a much greater exhauster than wheat, I believe was almost universal in Virginia at the period when his notes were written. It is, I think, very far from being as general now, with regard to the crop itself. But I am not sure, that as a system, the culture of tobacco is not much more exhausting than that of wheat. Granting, what I believe, that a single crop of tobacco reduces the fertility of the soil less than one of wheat, we must take into account, the much greater number of hands required for a given space—and of course the much more extensive crops of corn required; so that the question is not simply whether wheat or tobacco exhausts the most, but whether tobacco, with the increased crop of corn which it requires, does not injure the soil more than wheat. It is also worthy of consideration, that hilly lands subject to wash, are more injured in general by crops that require hoeing, or other constant tilth, than grain crops that are only cultivated for seeding.

Mr. Jefferson's comparative estimate of the expense and profit of a hogshead of tobacco and a hundred bushels of wheat, seems to rest on very vague and insufficient *data*. Wheat being much heavier in proportion to its value than tobacco—the relative value of each must be greatly influenced by its distance from market, and wheat when got ready for delivery, is subject to more casualties than tobacco, which may be kept over from year to year—while wheat is subject to many injuries from the weevil, &c., and is constantly suffering in quality, and diminishing in quantity, if not speedily converted into flour. With regard to the greater severity of labor for a crop of tobacco, there may be some room for doubt. It is difficult to draw an exact comparison, but I incline to the opinion of Mr. Young, that Mr. Jefferson is mistaken. The culture of tobacco requires more skill and more incessant care than that of

*De l'Administration Provinciale par M. le Trone. Tom. 1. p. 267.

†Notes on the State of Virginia, page 271.

wheat, and perhaps more than that of any other agricultural product of this country; but I think the labor of a wheat crop the most severe. A much greater proportion of women and boys can be usefully employed in making a crop of tobacco, than one of wheat.

Mr. Young's inferences from this passage in Mr. Jefferson's notes, are certainly very unfavorable to the agriculture of Virginia, and I am afraid not altogether unjust. The subject is one of great moment to the cultivators of middle and lower Virginia. I trust, however, that as the exhaustion of our soil has been owing to particular circumstances necessarily attending our husbandry, his prediction that it is to be ruined by the cultivation of wheat will not be realized.

In clearing and cultivating our lands, when a large proportion of our most fertile soils were clothed with their native woods, and might be bought at very low prices, the most natural, I will not say the most proper course, would be, as it generally was, to cultivate the cleared lands as long, and perhaps longer than they would pay the expense of cultivation—and to go on from year to year clearing fresh lands and subjecting them to the same process of cultivation and exhaustion: and in this way the gross annual products were not diminished, while the land was growing worse. This course of husbandry might long since have worked its own cure, and forced upon us a more improving system; but the immense extent of fertile and unoccupied lands in our western country opened a new field to industry and enterprise, and thus individuals who had exhausted their lands in Virginia by severe cropping, with a moderate share of prudence and industry, were generally improved in their circumstances by migration, while the soil of Virginia was becoming more exhausted. One circumstance has checked, in some degree, this tide of emigration. The higher prices we are able to realize from our crops, by our being so much nearer to good markets. But for this, I apprehend that our population, which has been in general regularly increased, would have been in a rapid course of diminution. With this advantage, which we are likely to retain for a long period of time, I am persuaded that our more fertile soils, and even those that are much exhausted, if the means of improvement are within reach, may yield a very fair return for the skill and industry employed in their cultivation. The culture of tobacco has gradually given place to that of wheat, as fresh lands have become scarce, and the facility of getting crops to market in the country above tide-water, increased. Agreeing fully in opinion with Mr. Young that wheat is a most exhausting crop, I think we should gain little by this change if we were not able to counteract its effects, by connecting with the cultivation of wheat, that of clover—a plant invaluable for its fertilizing qualities, and peculiarly suited to corn in the same rotation for wheat. It has long been cultivated most successfully on our fertile wheat soils; and I have no idea that those which have been worried by severe cropping can ever be restored without it; but this blessing of providence will have been bestowed on us in vain if we want the care or skill to turn it to account. It is true that some of our most fertile alluvial soils will produce heavy crops of clover without assistance—a good crop can be obtained on lands inferior to these, but such as may be denominated as fertile and in good heart, by the aid of plaster; but clover seeded on soils that have been worried by severe cultivation will never produce a heavy crop without the assistance of lime, marl, or a heavy dressing of manure—and even when such a crop is obtained, a succession of grain crops will soon reduce the soil to its former condition. I have never thought so meanly of our Virginia husbandry, so far as relates to our *annual crops*, as most others; on the contrary, I believe the management of our tobacco from the time the seed is sown till it is ready for market, is generally excellent. Our wheat crops on our most fertile soils, where wheat is the principal object of cultivation, are in very many instances, managed in a way that would not be discreditable in any country; and the culture of Indian corn is no where better understood or, more skilfully conducted. Indeed I have often thought it too good for the land on which it was bestowed. I wish I could extend my praise farther; but I think in the collection and application of manures, the foundation of all good husbandry, too many of us are lamentably deficient. I have no right to set my opinion above that of others, who are as capable at least as myself of forming a correct one—and I am not at all disposed to enter into the controversies that have been carried on in your Register with regard to the three-shift, four-shift, and five-shift rotations; one may be preferable to the other, according to the character of the soils to which they are applied; with good management, all and each of them may succeed, but except on lands of extraordinary fertility, I am persuaded that in the course of time, and that not a long one, without the aid of manures, they must all fail. Let us take for example, the four course rotation of clover, wheat, corn, and wheat. If the crop of clover has been a fair one, and it has been turned in, or even cut and carried off, if the growth has been luxuriant, a good crop of wheat may be expected after it. The succeeding crop of corn will require all the manure that can be collected for it. If well manured, the product in a favorable season will be large, and the crop of wheat following it through, in a general way, inferior to that sown on the clover ley may still be good—and if it receives, at or after seeding, throughout, or on such parts as most require it, a top-dressing of manure, the clover sown on the wheat will hardly fail if the season be favorable—certainly not where the top-dressing has been properly applied, and in this way the fertility of the soil may be kept up, or even increased—but leave out the manuring, and the land will sooner or later, according to its degree of fertility, be reduced to the condition which Mr. Young anticipates. Plaster applied to the clover will aid manure, but cannot answer as a substitute for it. Marl and lime are without comparison more beneficial than plaster, as they improve the soil itself, while plaster only acts on the crop. In the lower country, where marl or shell lime can be easily obtained, the task of improvement is comparatively easy; but you will agree with me that their operation is greatly aided by animal and vegetable manures. Holding these opinions, I have observed with regret that some of your intelligent correspondents, I think most of them, seem to have a great antipathy to live stock. While I agree with them that close pasturing on arable lands is very injurious to the crops; and thinking as

I do, that neither our soil, climate, nor local situation are suited to raising large herds of cattle with a view to direct profit, I would, with a view to obtaining such supplies of manure as are indispensable for good husbandry, keep as large a stock of cattle as could be well kept through the winter on the long forage and offal of the plantation, and be maintained in summer on standing pastures; and I should deem it no sacrifice, if it were necessary, to circumscribe, in a moderate degree, the limits of my arable fields for this object, in the attainment of which I should gain another of no trivial importance—that of improving the sustenance, and adding to the comfort of my laborers and their families.

SOILS AND AGRICULTURAL ADVANTAGES OF THE FLORIDAS.—No. 4.

To the Editor of the Farmers' Register.

Plantation Wascissa, 10th Nov., 1835.

The sectional advancement of the middle districts, in wealth and pupulation, above the other districts of Florida, arising from her agricultural success, especially invites an examination of her soils and local advantages.

In my previous letters, I have spoken highly of the rich and alluvial lands to be found in the east; and lest, in now extolling the soils of the middle district, any discrepancy should appear to others in this equal commendation of lands, distinct in character and capabilities, I will at once expose my opinion of the characteristic advantages of each, as calculated to avail the emigrant in his selection of location.

There are choice lands composed of the best soils to be had throughout both these adjacent sections; and when I admit the greater richness and *durability* of the arable swamps of the east, over any soil to be found in the middle district, I claim at the same time for the latter, the greater advantage of a *versatility of soil and climate*, suitable for rotatory crops, which is not obtainable in the former.

To the capitalist, desirous alone of a profitable estate, and indifferent to the reputation and comforts of a farmer, who has the pecuniary ability of establishing suitable buildings and machinery, with the additional means of employing high salaried agents during his requisite annual sojourn of summer at the north, I unhesitatingly recommend the alluvial sugar lands of the peninsula. There can be no estate so profitable as a well regulated sugar plantation, and few lands are more adapted for its success than the above; but that is their limit. The eastern sugar planter must "*stick to his last:*" neither his soil nor climate admit rotation or variety of crop. He can have neither farm-yard luxuries, nor "many fields of variegated green," and is entirely without that diversity of occupation, which renders farming so fascinating. The autumn is his only harvest time—the sole exciting period of his labor—the summer, to escape ennui and biliary attacks, is passed in travel! Thus, whilst I appreciate the superiority of the soil, as suitable for the most productive of plants, I candidly allow that their settlement and successful cultivation, in prudence, can only be established by the *capitalist.*

On the other hand, to the *practical farmer*, limited in capital, but rich in industry, desirous of having neither idle time nor idle expenses, and equally ambitious of securing within himself the *provender of his household*, as well as remunerating crops—I urgently advise the undulating woodlands and fertile soils of the middle district. His crops may not be as valuable as those of the eastern planter—his soils less durable, and his fortune may accrue more slowly. But under a safe climate, with his domestic comforts around him, and in the continued vocation of his farm—increased by every variety of crop, in endless rotation; he has no cause of envious solicitude: for though gathering riches slowly, he is annually reaping the larger harvest of comfort and contentment. Thus, I neutralize the advantages of these distinct sections of Florida: the east is the district for *wealthy plantations*—the middle, for *frugal farms.* I now proceed to the examination of the lands of the latter.

It would be tedious to detail each and every variety of soil to be found throughout the several extensive countries, comprising the middle district; for every object of these letters, their characteristics are sufficiently similar, to be considered in description, essentially the same; and though I admit that in some countries a larger proportion of good lands are to be had than in others, I yet hold it indisputable, that the good lands of all, are composed of the same earth, possessed of the same capabilities, and known, provincially, under the same name.

The face of this section of Florida, is correctly expressed in the term "rolling"—being for the most part undulating hills and planes; and in its primitive appearance, before the axe of civilization mutilated its forests, must have been extremely picturesque and scenic. It still fascinates in woodland variety; though, for culture, the land in some places, is abrupt in declivities, and barren in its growth.

The *genera* of the soil are lime and clay, and are varied in productiveness in the different countries, by the admixture of more or less sand. The great *fault* indeed of the land throughout the territory, is the *predominance of sand.* As the general character of the *best soils* in this district, it may be thus described:—1st—*putrescent vegetable matter* (formed by the annual deposite of forest leaves and decaying trees,) mixed in variable quantity with argillaceous earth, from four to ten inches. 2d—a *secondary* soil of *yellow sandy clay* combined with magnesian earth, lime, or *sulphate of potash*; varying in depth from one to three feet. 3d—*alluvial clay*, in all its varieties of red, yellow and white—tenacious and plastic; oftentimes based on limestone, and sand and shells; extends from three to fifteen feet and more; growth of the above heterogeneous, but chiefly white oak, dog wood, poplar, tulip, with wild grape, and other undergrowth.

Such is the general formation of our fertile lands; and I may now state the *variety* of soils (here common) under their provincial nomenclature, in the order in which they are for durability estimated. 1st—dogwood hammock. 2d—low or cane hammock. 3d—oak and hickory upland. 4th—pine and hickory. 5th—gray or mulatto hammock. 6th—black-jack and pine. The term "hammock" so frequently here in use, does not seem to have any special or conclusive definition. I have heard it, by good farmers long resident in Florida, applied as well to high and dry lands as by others, to most aquatic soils. I may probably convey a sufficiently correct conception of its general application, in saying—that any rich arable soil covered with a dense, mixed, native forest and strong undergrowth, is so termed; seemingly in contradistinction to the open oak and hickory and pine lands. The species of "hammock" is taken either from its color of soil, as the "gray hammock," or from the prevailing growth—as the "dogwood hammock."

This long enunciation of soils exhibits in itself a great hypothetical cause of the early settlement, and increased prosperity of the middle district. The emigrant, whether desirous of cultivating cotton, rice, tobacco, or grain, or of breeding cattle, at once found before him, the land best suited to his wants—and all equally alluring in verdant pasturage, fertile forests and well furnished springs! The good lands are consequently mostly all "entered:" though large tracts are held still by individuals in the market, and at rates *cheaper than any other land, of similar quality, in the southern country*. They can be bought at from $10 to $12 per acre, and are in no ways inferior to lands now selling in Alabama at $25! Fifteen hundred lbs. raw cotton can easily be harvested from each acre by an industrious farmer; and the country affords the most intelligent society, with every wished for banking and moneyed facility. Fifteen acres of land for every effective laborer, is the usual *pitch* of our crop—that is, ten acres of cotton, and five of corn, besides grain, potatoes, &c. Some thriving planters exceed this. The cotton crop has never failed in Florida; and in many instances have planters made more than they could save. The crop of the present year will, notwithstanding the early and unprecedented frost, nearly double that of 1834. Most of our planters are reaping unusual returns; and as it is only by individual success that I can convince those abroad of our well doing, I trust the following gentlemen will pardon the publicity I give their names.

It will hardly be accredited in your state, Mr. Editor, that a planter working only forty servants, can make and house in one crop 450,000 lbs. of fine staple upland cotton, besides 3,000 bushels of corn, and some 20 barrels of sugar and syrup—leaving his crop of oats, rice and potatoes untold!—and yet this is done in *middle Florida*; and to prevent incredulity, I may now (first asking his leave for its publication) state, that the fortunate planter is my respected neighbor, Daniel Bird, Esq. of Jefferson county. The other gentleman referred to, is Col. Robert Gamble, formerly of Virginia, who will this year realize from 65 acres of land, which have been for the last six years under continued cultivation of sugar cane, (the most exhausting of crops,) upwards of seventy bags of cotton. It is these facts which, in showing what is realized, exhibit the strength and richness of our fertile lands. I do not write to mislead, by exaggeration—for I am open to immediate correction; but I feel that the lands of Florida have not been justly estimated above. Let us, however, take the *minimum* of crops on our good and bad soils; this never is less than 600 lbs. of cotton per acre; and when with this, it is remembered, that we raise a sufficiency of sugar and syrup, of rice and tobacco, for our own consumption, and oftentimes for sale; with grain and cattle in superabundance, will it be doubted, that the soils and improved advantages of the middle district, are the producing causes of her sectional prosperity?

The *rumored* unhealthiness of the climate, has perhaps, injured the otherwise fair fame of Florida. If so, it is calumniated. The health of the country districts, for a tropical climate, is not bad. Persons can scarcely expect Norwegian robustness beneath the vertical rays of the sun! Tallahassee, as a city, is undoubtedly sickly during the autumnal months; but even her mortality, appears more alarming to the stranger, than it in reality is—from the regretted fact, that her obituary is mostly made up of northern residents, unacclimated, and who, in their mercantile avocations, imprudently remain upon their first arrival, an autumnal sojourn. Their death, widely reported as "*died in Florida*," appal the emigrant ignorant of circumstances, and wrongly calumniate the health of the whole territory, from the casualties of an ill regulated city! The evidence of the general *salubrity* of the climate, is to be found in the rapid increase by births of the mass of our population, and of negroes; and I will venture to assert, that in three plantations out of every five, in the middle district, the gangs will be found to have increased by births, during the last six years, at the rate of eight to ten per cent. per annum!

I have been better than two years in Florida, and having now concluded the observations, my travel in the territory has permitted me to make upon the general character of the soils, I shall in my next, submit for your approval, the *details* of *trials* which I have made both in sugar and cotton cultivation—the egotism of which I hope will be overlooked, in the consideration, that I only desire that the *comparative* results of those two important crops may practically exhibit to others, not only the advantages of *both*, but also enable them to decide which can be made in middle Florida the most profitable.

FARQ. MACRAE.

CALCAREOUS ROCKS IN MECKLENBURG, PRINCE EDWARD, AND CHESTERFIELD, AND GYPSUM IN CUMBERLAND.

[The following letter was drawn forth by our inquiries respecting specimens of a singular kind of calcareous rock which we had received from Dr. Morton, and had lately examined, for the purpose of ascertaining the amount of their calcareous ingredients. The specimen from Finneywood, Mecklenburg, contained 72 per cent. of carbonate of lime—that from Mr. Branch's farm, in Prince Edward, 65—and one from the land of George Johnson, Esq., Chesterfield, 76 per cent. The latter was obtained from rocks thrown out by freshets, from the bottom of Winterpock creek, a stream which enters the Appomattox about twenty miles above the falls. All these specimens agreed precisely in appearance. The rock was hard, and seemed to have been formed of a mass of small sea shells, mingled with silicious earth. The impressions of the shells were perfect, but all hollow, their entire substance having been removed. The open, yet hard texture of the rock, made it something like buhr stone, and possibly it might serve to make millstones. Its great hardness will forbid its being used for manure, unless first burnt to lime. But it is rich enough to pay well for that preparation—and its open nature would make a less degree of heat requisite for the purpose. This rock well deserves the trouble of searching for—and though its quantity is yet no where known to be very considerable, its being discovered through so extensive a region, gives new grounds for the hope which we have so often expressed, that the means of using calcareous manures in Virginia will be greatly and profitably extended, far beyond the limits which were formerly supposed to be fixed.]

To the Editor of the Farmers' Register.

Prince Edward, Nov. 20th, 1835.

I have just returned from a laborious professional tour, and have found yours of the the 7th inst. I received this with great joy, considering I could not read it all, and have determined to answer it forthwith, lest my evil genius, *procrastination*, should load my conscience with an additional burden to that which has been so long accumulating. When I was returning from your house I made many resolutions about writing more for the Register than I had done, all of which have been broken. I have, however, written a good deal; but being called off while the pieces were unfinished, they could not stand the ordeal of my own criticism, when I returned. What I write must be completed at a sitting, or it commonly proves an abortion. I know the Register cannot lose much by these, my short-comings; but *I* do. Whenever I write for it, I find my eagerness for farming increases; and I wish that all your subscribers would try the effect of an occasional contribution, as means of their own agricultural improvement.

I regret that I am able to give so little information in relation to the rocks sent you last spring. Those from Finneywood, Mecklenburg, were given me by S. C. Anderson, Esq., of this county, for transmission to you and Professor Rogers. I learned from Mr. Anderson that they were turned up by the plough in large quantities, on a farm called Finneywood, on a creek of the same name, in Mecklenburg; that the soil about them had a black color, and that he was much struck with the promising prospects it held out for improvement. I was informed that most of this calcareous material could easily be crumbled in the fingers, after being moistened. It has been some years since Mr. Anderson procured the specimens. The petrified impressions of shells, obtained from Capt. Branch's, were found lying on the surface on a high hill in the woods; and the bed to which they belonged has not been found. I went to his house to investigate the matter, but neither he nor his sons were at home, and I could get no accurate information regarding the particular locality. I believe that Prof. Dame of Hampden Sydney, on analysis, obtained precisely the same result with yours. While at Capt. Branch's, I found a great deal of clay marl, interspersed with large calcareous nodules, similar to those sent you from my land. This marl may be found at several places in his neighborhood, and at various others through the country. It is usually incumbent on, and sticking to beds of stratified hornblende rock. These beds of hornblende are found about the streams of water, and the slopes leading to them, and give character to the soil of such places by disintegration. The dividing ridges between the streams are usually covered by a much poorer soil, interspersed with quartz rock. The beds of hornblende, however, are doubtless continuous, and penetrate through these ridges at a great depth. They may commonly be found on both sides of the ridges, deposited in the same direction and possessing similar accompaniments.

While on this subject, it may be proper to mention, that the little land which I have dressed with my weak clay marl, and afterwards clovered, presents astonishing marks of improvement, far beyond my most sanguine hopes. Before clovering the fertilizing action of the marl was not so striking.

The calcareous rocks on my land (specimens of which were sent you,) have proved too obdurate for my awkward attempts at calcination. I suppose them to be carboniferous limestone and marlite. There is a large mouldered bank of them—dug up many years ago—which effervesces fiercely on the application of acid. I mean to spread this on the adjacent lands.

I find more gypseous clay on my land than I at first supposed. I do not wish to exhaust this, until I get more land marled, for its application. I have tried a little, and it acts finely after marling. There is on the land of Col. Witson of Cumberland, about four miles from me, and near the Appomattox a stratum of this, which, I would suppose, almost inexhaustible. I suspect it to be the out-running of a large vein of coal. It consists of crystals of selenite, about the size of grains of corn, very closely impacted with an unctuous cream-like matter in the interstices. I see so reason why the best of plaster might not be made by grinding this selenite. If necessary, the intervening clay—very little in quantity—might be washed out in a running stream.

Besides the clay marl interspersed with calcareous nodules, I have found some devoid of these, which would effervesce smartly on admixture with acids. As this marl was lying adjacent to large ledges of feldspar rock, I suspected that its alkali might be potash. Feldspar, however, sometimes contains lime.

A sedulous investigation into matters of this sort might produce important developements.

It is not probable, that for some time to come, manufactories of porcelain will be erected in our state; yet it is proper that some record should be made of the localities in which the materials for making it may be found. Kaolin or porcelain clay is very abundant in this section—but generally of a coarse quality. There is, however, a body of it in the ice house at Ranes' tavern, Cumberland, of fine texture, and white as snow.

W. S. MORTON.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

[Continued from p. 469 Vol. III.]

On foreign and British wool.

The importance of the woollen manufacture, both to the commercial and laboring classes of this nation, has long been felt: yet it is only within the last forty years that the subject has been scientifically considered, or any efficient measures have been taken in order to improve the quantity and quality of British wool.

As the extent of the present work will not admit of a detailed account of prejudices which are now daily disappearing, we propose, in the present chapter, only to state the essential properties of wool, and concisely to notice the improvements already made, together with those means which experience and reason evince to be the best calculated for that purpose.

The growth of wool is always completed in one year, at the expiration of which it spontaneously decays, and is naturally renewed. In this respect, indeed, the covering of sheep bears a close resemblance to the hair of most other animals; though it differs widely in the following particulars: wool is considerably finer, grows more uniformly, each filament growing at equal distances, and separating nearly at the same time from the skin; and, if not shorn in time, naturally falling off, being succeeded annually by a short coat of young wool. Another peculiarity in wool is, the different degree of thickness which prevails in various parts of the same sheep, being closer at the extremities or points than at the roots, and the part that grows during the winter being of a much finer quality than that produced in the summer.

Various are the names given to wool, according to its state or relative degree of fineness. When first shorn, it is termed a *fleece;* and every fleece is usually divided into three kinds, viz. the *prime*, or *mother-wool*, which is separated from the neck and back; the *seconds*, or that obtained from the tails and legs; and the *thirds*, which is taken from the breast and beneath the belly. This general classification of wool corresponds with the Spanish method of sorting into *Rafinos*, or prime; *Finos*, or second best; and *Terceras*, third, or inferior sort; the initial letters of which words are usually marked upon the bags when it is exported: but the wool-staplers in this country distinguish not less than nine different sorts that are broken out of small fleeces, the names given to which prove the nice discernment of the persons employed; we therefore subjoin them for the information of our less informed readers.

No. 1. Is *Short-coarse;* and very descriptive of its character.

2. *Livery,* } old sorts, into which the fleece
3. *Abb,* } was formerly divided.

4. *Second.*—Probably a second or better *abb*. and the first alteration in the mode of sorting; which arose either from the improvement of fleeces, or in the art of breaking them. This, and all the subsequent names, seem to have been in regular succession of quality to the top of the list.

5. *Downrights.*

6. *Head*, or *chief.*

7. *Super-head.*—An advance upon the preceding sort.

8. *Picked Lock.*—First made, perhaps, in small quantities.

9. *Choice Lock.*—Still more excellent.

Besides these sorts, there is another recently introduced into the list, and called *Prime Lock;* which, as its name indicates, is the finest that can possibly be obtained: and some have even gone so far as to distinguish *fourteen* different qualities.*

Till within a few years, the finest wool manufactured in this country was obtained exclusively from Spain, and next to Spanish wool, the English sheep, at that period, indisputably furnished the best commodity of the kind in Europe. Previously to the introduction of Spanish sheep, the finest and most esteemed sorts of British short wool were the Ryeland, Dean-Forest, Mendip, South-down, Wiltshire, Shetland, and Cheviot fleeces: but by the judicious crossing of Merino rams with the choice British sheep, particularly of the Ryeland breed, wool, even of the *fourth descent*, has been obtained, which, in point of fineness and texture, has proved nearly equal to the best Spanish. For this improvement, at that time deemed of the highest importance to its agriculture and manufactures, the British nation was indebted to the patriotic exertions of Lord Somerville, of the British Wool Society, the Board of Agriculture, and Dr. Parry, of Bath.† With the same noble views, his Majesty, George III., for many years previous to his illness, annually permitted some of his Spanish sheep to be sold at reasonable prices, under the auspices of Sir Joseph Banks: and, in many instances, allowed them to be used gratuitously.

The expectations thus raised have, however, been disappointed; and the momentary advantage that was gained by these crosses, has been wholly destroyed by the superior quality of the German wools, and the low prices at which they are now imported. The whole evidence before the Committee of the House of Lords, appointed, in 1828, to inquire into the state of the wool trade, goes to prove, that the wools of Bohemia and Saxony have entirely superseded the British short wool in the greater part of our cloth manufacture; and the consequence has been, that the value of the latter has fallen below a remunerating price to the grower. To this alarming fact is to be added

* The tables inserted in this chapter show the common proportions of the different qualities in a fleece of South-down wool.

† The details of the various experiments, conducted by the different public-spirited individuals above named, being too numerous for insertion, a few only of their general results can be given. Such of our readers as possess leisure and inclination to observe the gradual progress that has been made in this national object, will be amply compensated by a perusal of Lord Somerville's "System, followed by the Board of Agriculture," &c. 8vo. 1800; also his Lordship's "Facts and Observations on Sheep," &c. 8vo. 1803; the second volume of "Communications to the Board of Agriculture;" Dr. Parry's "Facts and Observations on the practicability of producing British Clothing Wool equal to that of Spain;" and the ninth volume of the "Letters and Papers of the Bath and West of England Society."

that of the rapid increase of the fine woolled flocks in New South Wales, which bid fair, at no very remote period, to supply the whole demand of this country.

We shall now proceed to state some of the principal requisites, which are indispensably necessary to constitute good wool. These are:—

1. The *length of the staple;* for this regulates the various fabrics to which the fleece is destined. Thus, in carding wool, a *short pile*, and a disposition to assume a crumpled, or spring-like shape, is an object of prime importance. This shrivelling quality, Mr. Luccock remarks,* cannot prevail in too high a degree, if it be to make cloths requiring a close and smooth surface: but for cloths where a long and even nap is required, too large a proportion of this curling property he conceives would be detrimental: and consequently a *long* pile or staple will be preferable. There is, however, a certain point, beyond which, if the crumpling quality proceeds, the wool becomes less valuable, on account of the superior length of the curves, which render it difficult to break the staple sufficiently. The distribution of the hairs in this staple has been compared to that of the grain in a very crooked piece of timber, or to waved bars of metal, so formed that the convex part of one fits into the concavity of another; and this peculiar property cannot be communicated to wool where it does not naturally exist.

2. *Pliability* of wool is another important quality to which the attention of the grower should be directed; as, without this elasticity, it will be unfit for the purposes of manufacture.

3. The peculiar property, termed the *felting quality*, is of equal importance with the preceding; and, though not evident to the eye, is in fact indispensably requisite in all wools which are wrought up into such cloths as are submitted to the action of the fulling-mill. Mr. Luccock describes it as "a tendency in the pile, when submitted to a moderate heat, combined with moisture, to cohere together, and form a compact and pliable substance."* This valuable property is possessed in a high degree by the Spanish sheep; and, according to Mr. Luccock's opinion, the Cheviot, Morf, and Norfolk fleeces are the best adapted for the purposes of fulling.

4. A *soft pile* is also an essential requisite to constitute a good fleece. In this, as well as in the other properties already enumerated, the Saxon and the New South Wales wools peculiarly excel;† and among the British fleeces, those of Shetland stand unrivalled in this respect.

5. The *specific gravity*, or relative weight of the pile is a quality to which the attention of wool growers has not yet been directed so particularly as the subject requires. In order to ascertain the comparative weight of different samples, Mr. Luccock directs each of them to be brought as nearly as possible to the same degree of purity, to expel all the moisture which wool obstinately retains, and extract all the air contained in the interstices of the staple.‡

6. The *smell* of the wool is not a property to which much weight can attach: provided no disagreeable odors are emitted, or any of the effects of moisture are exhibited, no one scent can be preferable to another.

7. In *color*, it is essential that wool should, as far as possible, be perfectly white.

8. The last property to which the attention of the growers of wool should be directed, is trueness of hair, or a uniform *regularity of pile*, in which no coarse, shaggy hairs are perceptible; as the latter, by reason of their brittle nature, will very materially affect the progress of the manufacturer. Such coarse hairs, as well as *kemps* or *stichel hairs*, (which are generally short, brittle, pointed, opaque, and of a gray or brownish cast,) are found principally in neglected breeds. Since, however, the art of combining the properties of the parent sheep in their offspring has been generally known, the expert grower of wool has been enabled to produce surprising alterations in the relative weight and fineness of the fleece.

In countries where wool is the chief object in the breeding and management of sheep, every other consideration is sacrificed to its improvement; but in England, the carcass is generally of greater importance than the fleece, and the weight of mutton has of late years been more attended to than fineness of wool. In this, the farmer has doubtless found his account; but they are objects which cannot be combined with equal advantage to both; and the consequence has been, that while the size of the principal breeds of our short-woolled sheep, and the weight of the fleece have been gradually increased, a proportionate deterioration has been occasioned in the quality of the wool.

The fact has, indeed, been denied by the breeders; but evidence, entitled to so much confidence as to be apparently conclusive, has been produced before the Committee of the House of Lords, already alluded to, establishing it, generally, beyond the possibility of doubt; as will fully appear from the following tables, selected from the evidence of many eminent wool dealers and manufacturers, and extracted from the Minutes. This, however, cannot apply to the long-woolled breeds, which in point of profit to the grazier, and of national value, rank among the very first. The length of the fleece not only gives a large weight, but the strength of the staple, and even its coarseness, are materially serviceable in the manufacture of carpetting and blankets.

*In his valuable treatise on "The Nature and Properties of Wool," p. 147.

†Treatise on Wool, p. 161.

‡See page 285.

* Treatise on Wool, p. 173.

PARTICULARS OF SOUTH-DOWN WOOLS ASSORTED BY W. AND J. CUNNINGTON, UPAVON, NEAR PEWSEY, WILTS.

	List.	Warp.	Abb.	Downhts.	Head.	Super.	Choice.	Prime.	Pick.
Devenish:									
1823 - - - 3,974 Ro	110	209	353	369	658	611	800	848	16
1827 – - - 3,754 R	96	93	397	374	758	956	636	444	—
Dowden, &c.									
1823 - - - 2,874 Ro	92	137	215	190	427	345	400	967	101
1827 - - - 2,705	60	182	255	186	513	622	473	421	43
Whitchurch:									
1824 - - - 10,405 Rb	433	495	1,099	1,178	2,030	1,647	1,644	1,799	80
1827 - - - 10,550 N	366	358	1,179	1,036	2,599	2,756	1,552	687	17
Wensbro:									
1815 - - - 1,006	5	70	43	20	36	77	197	498	60
1827 - - - 1,419	10	70	110	90	247	293	310	289	none.
Saph:									
1815 - - - 932	6	59	29	16	19	41	207	497	58
1827 - - - 1,236	20	50	107	85	200	256	358	246	4
Tuckwell:									
1815 - - - 28,492	38	242	130	67	89	271	719	1,244	50
1827 - - - 2,787	48	150	238	220	463	486	544	638	none.
Dean:									
1815 - - - 2,478 21	21	209	95	69	91	193	465	1,253	82
1827 - - - 2,611 N	64	115	190	200	384	399	444	786	29
Powell:									
1815 - - - 1,750	7	112	64	40	67	148	347	875	90
1827 - - - 2,184	52	55	218	94	376	273	411	705	none.

A STATEMENT, SHOWING THE COMPARATIVE WEIGHT OF THE DIFFERENT SORTS PRODUCED FROM (15 TODS) 420 POUNDS OF CLOTHING WOOL GROWN IN NORFOLK, BY MR. JAMES FISON, WOOL DEALER, OF THETFORD, NORFOLK.

	1793	1808 and 1809	1818 and 1819	1827 and 1828	Prices of Sorts in 1828.	
	lbs.	lbs.	lbs.	lbs.		s. d.
Prime	200	144	56	14		1 3 per lb.
Choice, and Choice Grey	96	80	48	24		1 0 "
Super and Middle Grey	64	80	96	56		0 10½ "
Head, Downright, and Third Grey	52	104	168	152	Head	0 10 "
					Downrights	0 9½ "
					Third Grey	0 8 "
Seconds, &c. included in 1793, 1808, and 1809						
Seconds			20	80		0 9 "
Abb			10	48		0 7½ "
Britch, &c.			2	6		0 5 "
Livery			8	24		0 6¼ "
Waste	8	12	12	16		
	420	420	420	420		

Calculating the weight of sorts produced at each of the above named periods at the present prices of sorts, the result will show, that if our clothing wool were equal in quality—

To the growth of 1793 - - - it would now make 12½d. per lb.
If equal to the growth of 1808 and 1809 - - - - 11¾d. "
If equal to the growth of 1818 and 1819 - - - - 10¼d. "
Actual value in 1827 and 1828 - - - - - 8¾d. "

It thus appears that the difference in quality between 1793 and 1827 is equal to 3¾d. per pound.

Although these tables only apply to particular districts, yet they corroborate the unanimous assertion of the manufacturers, that British short wool has generally degenerated in quality, while the increase of weight also appears from the following account, produced by Mr. C. Bull, wool stapler, of Lewes:—

STATEMENT OF THE RESPECTIVE WEIGHTS OF FIVE TODS OF WOOL, THE PRODUCE OF DIFFERENT FARMS, AT DIFFERENT PERIODS, BETWEEN THE YEARS 1803 AND 1827, INCLUSIVE.

Average of	Year.	Number of Fleeces.	Tods of 32 lbs.		Fleeces per Tod.
			Tods.	lbs.	
Produce, No. 1.	1803	869	58	7	15
do	1804	864	50	28	17 1-4
do	1806	923	65	24	14
do	1807	808	68	26	11 3-4
do	1815	866	57	14	15
do	1816	875	67		13
do	1817	915	75	12	12
do	1825	778	63	8	12 1-2
do	1826	835	72		11 1-2
do	1827	824	69	4	11 3-4
Produce, No. 2.	1804	1,191	75	5	15 3-4
do	1805	1,227	89	10	13 3-4
do	1806	1,165	90	22	12 3-4
do	1807	1.248	105	18	11 3-4
do	1808	1,338	105	10	12 1-2
do	1822	1,348	125	20	10 3-4
do	1826	1,189	105	17	11 1-4
Produce, No. 3.	1804	658	40	14	16 1-4
do	1805	574	45		12 3-4
do	1806	572	42	16	13 1-2
do	1807	551	41	13	13 1-4
do	1808	650	45	18	14 1-4
do	1822	655	58	11	11 1-4
Produce, No. 4.	1804	1,306	83		15 3-4
do	1814	1,370	110	29	12 1-4
do	1815	1,350	104		12 3-4
do	1826	1,160	106	14	11
do	1827	1,210	115	3	10 1-2
Produce, No. 5.	1806	1,209	87	22	13 3-4
do	1822	1,195	96	23	12 1-4
do	1823	1,147	96	7	12

There are still, no doubt, some Down-land flocks, in which the original quality of the wool has been sustained;* and others in which it has been even improved by crosses with foreign sheep; but, wherever the now almost universal system of feeding on artificial grasses and roots, and fattening at an early age, has been introduced, the deterioration is, with very few exceptions, evident. It is therefore clear, that high feeding is incompatible with the production of fine wool; and the farmer will henceforward find it most prudent to make his election of the breed he means to adopt, with a view to one object alone. That this has been already done, to a very great extent, appears from the large increase which is supposed to have been made within the last thirty years, in the heavy long-woolled sheep, while the lighter carcassed short-woolled breeds have diminished.

According to Mr. Luccock's tables, published in 1805, and to the calculations of the Wool Committee at Leeds, presented to the House of Lords in 1828, the number of packs of wool of the several qualities at the respective periods, have been estimated as follows:

1800,	short-wool	193,475	1800,	long-wool	131,794
1828,	do	120,655	1828,	do	263,847
	Decrease	72,820		Increase	132,053

The preference which thus appears to have been given to the long-woolled breeds, has not, however, wholly arisen from the superior profit to be obtained from the carcass; but from British short wool having been to a great extent thrown out of our cloth manufactures, while an increased

* The evidence of Mr Ellman, of Glynde, is to that effect; and shows also that the weight of fleece of his own flock has diminished about six ounces since 1817.

demand has arisen for the combing quality. The relative value of the fleece has thus changed: both the wool and the carcass of the heavy sheep, now severally produce the most money; and it has therefore become the interest of the farmer to breed them whenever his land will allow it.

It is impossible to read the evidence produced before the Committee of the House of Lords, without being convinced, that even if the quality of British wool had not degenerated, it would still have been superseded by the superior value of the foreign wool for most manufacturing purposes. The softness and felting properties of the latter, are stated by the concurrent testimony of all manufacturers who were examined, to be of such advantage in making fine cloth, that it would still continue to be used, even if the duty, which was lately repealed, were continued. Nothing, in short, but an absolute prohibition, can prevent its consumption; while the effect of that, or even of a continuation of the former duty, would unquestionably be to deprive us of the export trade. It appears, also, that by the admission of foreign wool into our manufactures, much of the British growth is brought into use by being mixed with it. Under these circumstances, it is hardly to be expected that the legislature will impose any further impediment to the importation of the foreign wool; and a dispassionate review of them must render it more than doubtful, whether, even were the prayer of the wool-growers granted, it would afford them the desired relief.

The quantity of foreign wool consumed in our manufactories, is supposed to be about 25,000,000 lbs. annually; of which the greater proportion is German; yet the importations are stated to consist principally of inferior and middling descriptions, though there can be little doubt that the best qualities grown, are sent to the English market. The proportions, if divided into parts, and the current value in 1828, were stated to the Committee of the House of Lords, as follows:—

			s.	d.		s.	d.
Saxon wool, 20 parts	2	from	6	6	to	7	6
	6	"	3	6	"	4	6
	6	"	2	3	"	2	6
	6	"	1	8	"	2	6
Austrian, or Bohemian wool, 30 parts	5	"	4	6	"	6	6
	10	"	2	3	"	2	9
	15	"	1	6	"	2	0

And the general average was calculated at 2s. 4d. per pound.

Spanish wool is imported in about equal proportions; and that from New South Wales is considered to average 9d. to 1s. 6d. for three-fourths, and the remainder from 1s. 6d. to 2s. 6d. per pound.*

The quantity of each of the above kinds, imported in the year 1827, was as follows:—

	lbs.
German	21,220,788
Spanish	3,898,006
Australian	512,758

And from Russia, and various other countries, different parcels, amounting altogether to 29,122,447 lbs.

The above importation from New South Wales, appears of very trifling importance; but it amounted to more than double that quantity in the preceding year; and the breeders in that country are making rapid strides both in the increase of their flocks, and in the improvement of the fleece. The Australian Agricultural Company are already in possession of 12,000 fine-woolled sheep; the Van Dieman's Land Company are making similar exertions; and many individuals of enterprise and capital have embarked in the speculation of growing wool for the supply of the English market. The wool produced in that climate, acquires a remarkable degree of softness, superior to that of any other kind. This has been proved by the comparison of fleeces shorn in England, from sheep which were afterwards sent out to New South Wales, with fleeces from the same sheep, shorn twelve months after their arrival, and sent there to ascertain the fact; and cloth of the finest quality that has ever been manufactured in this country has already been made from it.*

With such advantages, and with an unlimited range of pasturage, to an unknown extent, it is no extravagant speculation to calculate that, at no very distant period, we shall receive our largest supplies of fine wool from thosesettlements.

From the Maine Farmer.

MAKING MANURE.

Mr. Editor—A year ago last June I carted into my barn-yard about fifty loads of muck or mud turf, and loam. I dug it over a number of times during the season, with a hoe fork, yarding my cattle during the night time, and when I carted it out the succeeding autumn, it was "all of a color," black as animal manure itself, and I have not the least doubt that the materials I made use of to increase my manure were equally as good, after lying in the barn-yard a few months, as dung from the stable. I did not keep an exact account of the expense of carting the same, but I should think that one man with a yoke of oxen and cart would easily haul ten loads per day. At most it did not cost me more than one week's labor of one man and a yoke of oxen to haul fifty loads, which quite doubled the quantity of my manure, and by keeping the animal manure covered as much as possible with loam, &c. prevented much of its virtue from escaping into the atmosphere. After clearing out my manure the last autumn, I carted into my barn-yard forty loads of loam (common dirt) from banks and other places where there were but few stones, and spread it evenly over the yard, with this exception, my yard slopes a little wrong, which, when great rains happen, lets off much liquid manure, the most part of which is lost, (and I have not yet had "time" to fix my yard, which, should slope from every part towards the centre,) so I formed a little dam across the lower side to prevent the virtues of the manure from escaping.

* Minutes of Evidence, &c. p. 279.

*Minutes of Evidence, &c. *passim*.

The first of June last I also carted into my barn-yard 20 or 25 loads of loam, and spread it evenly over the surface—(this should be done immediately after ground is thawed in spring, as the sun, wind and rains are busy agents employed in sucking the virtues of barn-yard manure,)—and the present autumn, be it known, the loam has all become of a dark color, insomuch that it would be taken for stable dung. Every farmer has not an inexhaustible supply of muck, but every one can get common dirt, which I think is as good as any substance whatever to place on the bottom of a barn-yard. Some will say their ground is full of stones—then pick them out and haul them to some waste place out of the way if you will. I have carted upland loam, containing many stones, into my barn-yard, and with a common breaking up hoe dug over each load and carefully picked them out. An active man will hoe over a load of loam and pick out the stones in a very few minutes. Let no man living say he has not materials for increasing his manure. Every farmer can get dirt to bank up his cellar—so every farmer can get dirt if he will, and make excellent manure of it. Never did providence lavish on mortals a richer gift than is contained in our swamps—in pond holes on the margin of brooks—in sunken places, &c. Why will not enterprise put forth her hand and improve these golden privileges? When science shall have more fully illuminated the farmers of Maine, these inestimable treasures will be eagerly sought. When enterprise and energy shall take the place of that monster, prejudice—then indeed will our farmers make an abundance of manure. "The attention paid to manure in any country indicates with certainty the state of its agriculture," said a great agriculturist. What then shall we say of the agriculture of the state of Maine, if the attention paid to manure is the criterion of good or bad husbandry? Indeed, I think agriculture is very much improving in our state, and many worthy citizens may be found among us who well deserve the name "good farmers," but as often as we find one farmer who makes exertions to increase his manure by artificial means, how many may be found who pay no attention at all to the making of manure, if the facts could be known. Any one feeling a good degree of "state pride" would be unwilling to have the story told in Gath, or published in the streets of Askelon. I have not time, nor capacity, Mr. Editor, to do any thing like justice to the important subject of manure, but I thought that to throw out a few hints at this time might do no harm, and it might possibly be the means of doing a little good—and if by writing these few hints a single farmer should be prevailed on to haul a few loads of loam, muck or turf into his barn-yard, that would not have done it supposing these hints had not been written, it will be a sufficient remuneration for my trouble and time. As soon as I can get time, if circumstances are favorable, I will tell another story about ruta baga, and perhaps patatoes.

J. E. R.

Rumford, October, 1835.

From Kenrick's New American Orchardist, 2nd ed. (1835.)

ON THE DECLINE OF OLD VARIETIES OF FRUITS, AND THE PRODUCTION OF NEW.

The decline of many of the most valuable old varieties of fruit, has been noticed by several distinguished writers of different countries, both of the present and of the former ages; and in England, particularly, by the celebrated Thomas A. Knight. In our country, and in the vicinity of Boston, it has been more especially observed in regard to the old pears. For our best varieties of apples, and some other species, are mostly native fruits, or of modern origin.

Let no one suppose that the intelligent horticulturists here, have never been acquainted with the best of the old pears, which the intelligence and industry of ages had concentrated in France. Who is not aware that in every good collection, a proportion of the very best are *always sent*? How opposed alike to reason and to probability is the supposition, that even one of the best should have escaped? They must have been here received, in the numerous and ever varying *selections*, in the unnumbered importations.

Rozier, in the original edition of his celebrated Dictionary of Agriculture, which was completed in 1801, has candidly informed us, that for his description of fruits, he is almost wholly indebted to the no less celebrated Duhamel Dumonceau; and from the whole list of pears which he has described, he has recommended as their essence, for a moderate collection, fifty-three trees, of nineteen varieties, in different proportions. These are every one of them known among us; and more than half of them, including the very best, are decidedly of the kinds long since, from their defection, proscribed by those who cultivate for the markets of Boston. And of the list of twelve trees, of nine varieties, which he has recommended as the best of all, for a very small garden, three quarters of them, at least, are of the kinds which have long since ceased to produce perfect fruit, with those who cultivate for our markets.

We regret the circumstance, but have ceased to wonder at the cause—since the same complaints of defection have already reached us from other quarters—even from the capital of that country, for which those celebrated works were principally designed.

I shall, in the following pages, designate some of those, in the class of old varieties, once the finest of all old pears, whose duration we had hoped, but in vain, to perpetuate. For except in certain sections of the city, and some very few solitary and highly favored situations in the country around, they have become either so uncertain in their bearing—so barren—so unproductive—or so miserably blighted—so mortally diseased—that they are no longer to be trusted; they are no longer what they were once with us, and what many of them are still described to be by most foreign writers.

The gentleman who prepared the article on fruits in *Fessenden's New American Gardener*, has warned us to beware respecting some of them. He is well known with us as first rate authority.

In the markets of the city which formerly abounded with them, they are no longer, or but rarely, to be seen. The cultivators who furnish its supplies have given up their cultivation. Like the barren fig-tree they have been destroyed—but not without cause; for if they had not been accursed, their fertility and good qualities were gone: and they were no longer fruitful, but as the sources of vexation.

The practice of renaming those new, or unknown varieties, whose original names are lost, alter these old kinds, is objectionable, inasmuch as it is calculated to mislead—and to falsify the proofs of their mortality. From some fancied similitude, the barbarous names of antiquity are brought down upon us, applied to existing varieties. From semblance of name alone, the Gergon, or Jargon of antiquity has reappeared—it has been reclaimed, not merely as kindred, but as in all probability *identical* with varieties still existing.*

According to the theory advanced by Mr. Knight and others, and confirmed by their experience, the different varieties of fruit have their periods of existence fixed by the immutable laws of nature; and after a certain time, either sooner or later, comes on their decline and final extinction.

I shall offer some evidence to show that the complaints of defection are not confined to us alone—they have reached us from other and remote quarters. Bosc, in Nouv. Cours Complet, has asserted the change—that in France many of the kinds have become, from some cause, so altered in the short space of half a century, that it is sometimes difficult to know them, even in the exact descriptions and precise engravings of Duhamel; and with regard to many kinds described by Quintinie, the case is still worse. In the markets of fruits and legumes at Paris, as the commissaire general has informed us in his report for 1828, some of these same ancient, and with us once celebrated kinds, are no longer cultivated, even with them. He expresses astonishment at the *cause*—but the conclusion seems irresistible, that with them as with us, they are no longer worthy of cultivation; and that out of that city, and in its vicinity, the country around, these once famous fruits are at this day as liable to blight, and as unworthy of general cultivation as in the neighborhood of Boston.

The following are his words, extracted from his report: "one is astonished on viewing in the markets of Paris so very few melting Pears. We no longer see the *Sucre Vert, the Sucre Musqué, the Bezi de la Motte, nor the Bezi d'Airy* [*Bezi d'Heri?*] *very few Chaumontelles, very few Culotte de Suisse; no Royale d'Hiver* [Royal Winter,] *no Virgouleuse, and what is to be deplored, no Colmars.* [Some of these expressions, it seems evident from what follows, were designed to be understood only in a general sense. K.] These three last species sell from ten sous to two francs each, [about forty cents] and their cultivation is neglected!

"The Rousselette, so perfumed, so sought after by the confectioners, and distillers, is no longer of good quality.

How different this Rousselette from that which they cultivate at the hamlet of Cormontreuil, at the gate of Rheims! At that place they cultivate the Rousselette almost exclusively, and these altogether on espaliers. These espaliers offer at the end of August a sight the most rich and beautiful." See Annales d'Horticulture for 1828.

The unwearied efforts of the most distinguished cultivators of France, during the latter ages, in their attempts to raise new and valuable varieties of fruits from the seed, appear to have been accompanied chiefly with disaster. And M. Poiteau in one of his reports to the Horticultural Society of Paris, has asserted that the result of all their labor has been "*absolutely nothing.*" In adverting to the decline of the old French varieties of pears, in the vicinity of Paris, and the necessity of a renewal, he asserts that they must look elsewhere for new varieties to replace the old—*any where else but to their own country.*

He informs us that the celebrated Duhamel, during the long course of his scientific career, planted the seeds of all the best fruits which were eaten at his table, without being able to produce a single fruit worthy of cultivation. Others in that country—as the Alfroys, had during three successive generations, adopted the same course, and with no better success.

Their practice had been to plant uniformly, the seeds, only of the very best or ameliorated fruits—and to select from these, as the subjects of their experiments, those young plants only, which were furnished with large leaves, and large and fine wood. M. Poiteau ascribes the disastrous results of their experiments to these combined causes, and further states it as a fact recorded by several authors, that the seeds of the Winter Bon Chrétien always produce a detestable fruit. Mr. Knight has asserted that the seed of the *Wild Pear* fertilized by the stamens of the blossom of an ameliorated one, will yield a better fruit than the seeds of an *ameliorated pear.*

M. Van Mons has stated that "the Belgians give *no preference* to the seeds of table fruits, when they plant to obtain new ameliorated kinds." Those seedlings which are without thorns, and with stout wood, and large leaves, are by them rejected, as these are the signs of an early or inferior fruit. M. Van Mons ascribes the success of their experiments in obtaining so many fruits, which are in all respects so extraordinary, to the principle which they had adopted in the beginning—that in proportion as a fruit becomes removed from the wild state, or state of nature, by repeated regeneration, or planting always the kernels or stones of the last production, in that same degree will the fruit become ameliorated, until it attains the highest perfection of which a fruit is susceptible.

During the process of the amelioration, and of each successive remove, the austerity, or superabundant acid, which is the peculiar characteristic of the wild fruit, is diminished, and the saccharine matter is increased. But as a certain quantity of acid is an essential ingredient in every perfect fruit—it will appear self-evident that the process of regeneration, when carried too far, may prove

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* See t. 108 of the Pomological Magazine, where the authority of Menage and Duchat, and of Merlet are brought forward to justify the supposition, that the Jargonelle, asserted by them to be derived from Jargon, anciently Gergon, in Italian *Gergo*, in Spanish *Gericona*, all corruptions of *Græcum*, and by the inference of Merlet the *Pyrum Tarentinum* of Cato and Columella, the *Numidianum Græcum* of Pliny, the *Græculum* of Macrobius; that all these, named or described near two thousand years ago, are but one and the same; and no other than the Jargonelle of the present day.

injurious; and that excessive sweetness, by a short transition, degenerates into insipidity.

It is asserted by Mr. Knight, that generally, the old varieties of fruit begin to decay, first, in the colder latitudes; and that a fruit which there begins to decay, may yet be successfully cultivated in a more southern climate, or, what is equivalent, in the confined and warmer atmosphere of cities. Those varieties, therefore, which no longer succeed with us, may yet continue for a while to flourish in the middle regions of the Union, and especially in the interior, beyond the limits and influence of those cold eastern breezes from the Atlantic, which, rising with the diurnal appearance of the sun, vis't us so regularly and constantly at stated seasons.

There are some, however, who dissent from these opinions and conclusions—opinions, which, the continued experience of the ages, present as well as past, seems only the more abundantly to confirm. They do not, indeed, deny the *fact* of the destruction; but they *deny the cause*. In their attempts to sustain the credit of the old fruits by rendering them immortal, they would ascribe their deterioration to *any other* cause; to some supposed *alteration of climate*, and not of ours alone, but of the climate of all those countries where the same proofs of their mortality have appeared.

We await the proofs of such changes; meanwhile in their absence, I believe all will agree, that in adopting this theory, we adopt the safest course.

Mr. Knight and some others in England, and the Comte de Coloma of Malines, have succeeded in raising some new and valuable varieties of fruit from the seeds obtained by hybrydism or cross fertilization. In describing the principles and modes of practice of this art, I have had recourse to Phillips, to Knight, and especially to Lindley and M. Fries Morel, to all of them collectively. The same principles are alike applicable to trees of ornament and to flowers. But we are authorized in asserting, that this is not the mode which has been so generally adopted by Dr. Van Mons and others in Belgium—and that the mode by which so many new, and very extraordinary varieties of fruits have been there produced, differs essentially from this which I am now about describing.

The outer circle of the slender threads or filaments, which rise around the centre of the blossom or flower, are called the *stamens*, or males, and the central are called *pistillum*, pointals, or females.

The stamens bear at their summit a small ball called the *anther*, which contains the fertilizing powder called the *pollen*.

At the summit of the pistillum are the organs of secretion called *stigmata*, consisting of one or more intercellular passages leading thence to the base, where are situated the cell or cells in which are placed the ovula, or the rudiments of seeds.

The pollen, when viewed through a microscope, is found to consist of extremely minute hollow balls, filled with a fluid in which swim innumerable particles of an oblong or spherical form, and having an apparently spontaneous motion. When the anther is mature, it bursts or opens with an elastic force, by which its contents are dispersed, and a portion of them falling on the stigma which is of lax tissue, the moving particles of pollen descend through the tissue of the style, by routes specially destined by nature, into the cells, where the ovular are placed, and these being thus vivified, are converted into the seeds or embryo of a future plant.

The operation of hybridizing or cross fertilization must be performed in a dry day, and before the blossom is entirely expanded; the most favorable moment is just before the rising of the sun; the pollen being at that time humid, is closely attached to the anthers. The blossoms must be carefully opened, and the anthers extracted by delicate scissors, care being taken neither to wound the filaments which support them, or any other part of the flower.

About nine o'clock, the blossoms being exposed to the full influence of the sun, the matured pollen from another, variety must be carefully placed on the blossom which it is intended to fertilize, and from which the anthers have been extracted; and this operation must be repeated twice or thrice during the course of the day. By shaking the blossoms over a sheet of white paper, the time when it is perfectly mature will be ascertained. It is necessary to protect the prepared blossoms from the bees and other insects with thin muslin or gauze, which will not exclude the sun or air; and it is proper also to protect them from the rain and dews, till a swelling is perceived in the germ.

By screening the plants from the sun, and by frequent waterings, the maturity of the pollen and the stigma may be retarded.

When the process has been successful, the pollen which had been placed on the stigma, becomes so attached, that it cannot be removed with a hair pencil; it changes form and color and soon disappears, and the blossom will soon wither and fade. But when the process has been imperfect, the reverse, of all this is the case; the pollen is easily detached from the stigma, its appearance is unaltered, and it remains visible with the duration of the flower, which will continue for a long time.

The fertilized seeds thus yielded. produce generally flowers which resemble in color, or fruits which inherit mainly the qualities of the kind which furnished the pollen; while the form of the flower, or some of the constitutional qualities of the fruit, will resemble those of the plant which matured the seed.

No cross fertilization can take place between plants or fruits unless nearly related. None, for instance, can take place between the pear, apple or quince; or between the plum, peach or cherry, &c.

Wild plants or fruits while growing in their native wilds are generally perpetuated from generation to generation without change; but this is not the case with the hybrids or cultivated varieties, however isolated or far removed the tree may be, which produces the seeds, from any other of sit species.

The most intelligent writers have asserted, and it now appears to be admitted as an indisputatble fact, that the original number of varieties of the apple was very small, and that the numerous varieties, differing in size, form and flavor and periods of maturity, originated from the *wild apple* or *crab*, a small and very acid fruit. The pear, from a small and very austere wild fruit, has been in like manner wonderfully ameliorated. Mr. Knight seems persuaded that their fine varieties of native

English plums, originated from the *Sloe plum*, a wild and austere, small, black fruit—or according to Mr. Neill, from the *Bullace*, another wild plum, very small, and acid. The gooseberry, originally a small, indifferent fruit, has by cultivation, not only highly improved in flavor, but wonderfully in size. The large Dutch red and the large Dutch white currant, are highly productive and improved varieties. But the *white* currant, as Mr. Loudon asserts, is but a variety, produced from the seeds of the *red* currant.

Cross-fertilization may, indeed, effect important improvements, by combining in one object, those desirable qualities, which may be previously possessed by two other individuals in separate states. But it can never of itself, and alone, produce or create those opposite qualities, which had never existed before in any individual; but are as directly opposed to all that had ever before existed, as *white* is to *red* or to *black*, and we must look to other causes for such important changes.

The following mode, by which the Belgians have succeeded in obtaining so many new and extraordinary varieties, is from the account written by Dr. Van Mons—and for this valuable article, we are indebted to the researches of Gen. Dearborn, by whom this account was inserted in Vol. VII. No. 28 of the New England Farmer.

"The Belgians give no preference to the seeds of table fruits, when they plant to obtain new ameliorated kinds. When their plants appear, they do not, like us, found their hopes upon individuals exempt from thorns, furnished with large leaves, and remarkable for the size and beauty of their wood; on the contrary, they prefer the most thorny subjects, provided that the thorns are long, and that the plants are furnished with many buds or eyes, placed very near together. This last circumstance appears to them, and with reason, to be an indication that the tree will speedily produce fruit. As soon as the young individuals which offer these favorable appearances, afford grafts or buds, capable of being inoculated upon other stocks, these operations are performed; the apples on paradise, and the pears on quince stocks, to hasten their fructification. The first fruit is generally very bad, but the Belgians do not regard that; whatever it is, they carefully collect the seeds and plant them; from these a second generation is produced, which commonly shows the commencement of an amelioration. As soon as the young plants of this second generation have scions, or buds, proper for the purpose, they are transferred to other stocks as were the preceding; the third and fourth generation are treated in the same manner, and until there are finally produced ameliorated fruits worthy of being propagated. M. Van Mons asserts, that the peach and apricot, treated in this manner, afford excellent fruit in the third generation. The apple does not yield superior fruit before the fourth or fifth generation. The pear is slower in its amelioration; but M. Van Mons informs us, that in the sixth generation, it no longer produces inferior, but affords excellent fruits, intermixed with those of a middling quality."

Intelligent writers, those on whom we may rely, have assured us, that the new and numerous class of fruits which have arisen during the last forty years, in Belgium, is far more precious and inestimable in point of quality, than all previously known. They refer in this more particularly to pears.

Highly satisfactory specimens of some of the new species which are described in the following pages, have been seen and exhibited among us; enough to convince us of the decided excellence of at least a portion of them; but as yet but a small proportion of the new foreign varieties here described, have borne fruit in our country.

The unwearied labors of Van Mons, of Knight, of Coloma, of Hardenport, of Duquesne, of Nelis, of Liart, of Dorlain, and others, have probably effected more during the last forty years, than all that had been previously accomplished during twenty centuries.

All these fruits are recommended as highly deserving of trial in our climate. From them we must make our selections at another day, of such kinds only, as prove on trial, alike adapted to our climate, the very best in quality and the most productive.

From Chaptal's Chemistry applied to Agriculture.

SUCCESSION OF CROPS.

A soil may be forced, by extreme care, enormous expense, and the use of manure without measure, to produce all sorts of crops; but it is not in such sorts of proceeding that the science of agriculture consists. Agriculture ought not to be considered as an object of luxury, and whenever the produce of agricultural management does not amply repay the care and expense bestowed upon it, the system followed is bad.

A good agriculturist, will, in the first place, make himself acquainted with the nature of his soil in order to know the kind of plants to which it is best adapted; this knowledge may be easily acquired by an acquaintance with the species of the plants produced upon it spontaneously, or by experiments made upon the land, or upon analogous soils in the neighborhood.

But however well adapted the soil and climate may be to the cultivation of any particular kind of vegetable, the former soon ceases to be productive if constantly appropriated to the culture of plants of the same or analogous species. In order that land may be cultivated successfully, various kinds of vegetables must be raised upon it in succession, and the rotation must be conducted with intelligence, that none unsuited either to the soil or climate may be introduced. It is the art of varying the crops upon the same soil, of causing different vegetables to succeed one another, and of understanding the effect of each upon the soil, that can alone establish that good order of succession which constitutes *cropping*.

A good system of cropping is, in my opinion, the best guarantee of success that the farmer can have; without this, all is vague, uncertain, and hazardous. In order to establish this good system of cropping, a degree of knowledge is necessary, which unhappily is wanting to the greater part of our practical farmers. I shall here state certain facts and principles, which may serve as guides in this important branch of agriculture.

More extensive information on this subject may be found in the excellent works of Messrs. Yvart, and Pictet.*

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*"Cours complet d'Agriculture," articles *Assolement*

PRINCIPLE 1. *All plants exhaust the soil.*

Plants are supported by the earth, the juices with which this is impregnated forming their principle aliment. Water serves as the vehicle for conveying these juices into the organs, or presenting them to the suckers of the roots by which they are absorbed; thus the progress of vegetation tends constantly to impoverish the soil, and if the nutritive juices in it be not renewed, it will at length become perfectly barren.

A soil well furnished with manure may support several successive crops, but each one will be inferior to the preceding, till the earth is completely exhausted.

PRINCIPLE 2. *All plants do not exhaust the soil equally.*

Plants are nourished by air, water, and the juices contained in the soil; but the different kinds of plants do not require the same kinds of nourishment in equal degrees. There are some that require to have their roots constantly in water: others are best suited with dry soils: and there are those again, that prosper only in the best, and most richly manured land.

The grains and the greater part of the grasses, push up long stalks, in which the fibrous principle predominates; these are garnished at the base by leaves, the dry texture and small surface of which do not permit them to absorb much either of air or water; the principal nourishment is absorbed from the ground by their roots; their stalks furnish little or no food for animals; so that these plants exhaust the soil, without sensibly repairing the loss, either by their stalks, which are cut to be applied to a particular use, or by their roots, which are all that remain in the ground, and which are dried and exhausted in completing the process of fructification.

Those plants, on the contrary, that are provided with large, fleshy, porous, green leaves, imbibe from the atmosphere carbonic acid and water, and receive from the earth the other substances by which they are nourished. If these are cut green, the loss of juices, which the soil has sustained by their growth, is less sensibly felt, as a part of it is compensated for by their roots. Nearly all the plants that are cultivated for fodder are of this kind.

There are some plants which, though generally raised for the sake of their seed, exhaust the soil less that the grains; these are of the numerous family of leguminous plants, any which sustain a middle rank between the two of which I have just spoken. Their perpendicular roots divide the soil, and their large leaves, and thick, loose, porous stalks readily absorb air and water. These parts preserve for a long time the juices with which they are impregnated, and yield them to the soil, if the plant be buried in it before arriving at maturity; when this is done, the field is still capable of receiving and nourishing a good crop of corn. Beans produce this effect in a remarkable degree; peas to a less extent.

Generally speaking, those plants that are cut green, or whilst in flower, exhaust the soil but little; till this period they have derived their support almost exclusively from the air, earth, and water; their stalks and roots are charged with juices, and those parts that are left in the earth after mowing, will restore to it all that had been received from it by the plant.

From the time when the seed begins to be formed, the whole system of nourishment is changed; the plant continues to receive nourishment for the perfecting of its seed, from the atmosphere and the earth, and also yields to the grain all the juices it had secreted in its own stalks and roots: by this means the stalks and roots are dried and exhausted. When the fruits have arrived at maturity the skeleton remains of the plant, if abandoned to the earth, restore to it only a small portion of what had been taken from it.

The oleaginous seeds exhaust the soil more than the farinaceous seeds; and the agriculturist cannot be at too much pains to free his grounds from weeds of that nature, which so readily impoverish them; especially from the wild mustard, sinapis arvensis, with which cultivated fields are so often covered.

PRINCIPLE 3. *Plans of different kinds do not exhaust a soil in the same manner.*

The roots of plants of the same genus or family, grow in the soil in the same manner; they penetrate to a similar depth, and extend to corresponding distances; and exhaust all that portion of the soil with which they come in contact.

Those roots which lie nearest the surface, are more divided than those that penetrate deeply. The spindle or tap roots, and all those that penetrate deeply into the earth, throw out but few radicles near the surface, and consequently the plant is supplied with nourishment from the layers of soil in contact with the lower part of the root. Of the truth of this I have often had proof, and I will mention an example. If when a beet or turnip is transplanted, the lower portion of the spindle be cut off, it will not grow in length, but in order to obtain its supplies of nourishment from the soil, it will send out radicles from its sides, which will enable it to obtain the necessary supplies from the upper layers of the soil; and the root will become roundish instead of long.

Plants exhaust only that portion of the soil which comes in contact with their roots; and a spindle root may be able to draw an abundance of nourishment from land, the surface of which has been exhausted by short or creeping roots.

The roots of plants of the same and of analogous species always take a like direction, if situated in a soil which allows them a free developement; and thus they pass through, and are supported by, the same layers of earth. For this reason we seldom find trees prosper that take the place of others of the same species; unless a suitable period has been allowed for producing the decomposition of the roots of the first, and thus supplying the earth with fresh manure.

To prove that different kinds of plants do not exhaust the soil in the same manner, it is perhaps sufficient for me to state, that the nutrition of vegetables is not a process altogether mechanical: that plants do not absorb indiscriminately, nor in the same proportions, all the juices and salts that are presented to them; but that either vitality, or the comformation of their organs, exerts an influence over the nutritive action; that there is on the part of plants some taste, some choice regarding their food, as has been sufficiently proved by the

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et *Succession de Culture,* par Yvart. Traité de'Assolements," par Ch. Pictel.

experiments of Messrs. Davy and de Saussure. It is with plants as it is with animals—there are some elements common to all, and some peculiar to each kind: this is placed beyond doubt, by the preference given by some plants to certain salts, over others.

Principle 4. *All plants do not restore to the soil either the same quantity, or the some quality of manure.*

The plants that grow upon a soil, exhaust more or less of its nutritive juices, but all return to it some remains, to repair a part of its loss. The grains and the oleaginous seeds may be placed at the head of those which exhaust a soil the most, and repair the least, the injury done it. In those countries where plants are plucked up, they return nothing to the soil that has nourished them. There are some plants, to be sure, besides those mentioned above, that by forming their seed, consume a great part of the manure contained in the in the soil; but the roots of many of these soften and divide the soil to a considerable depth; and the leaves which fall from the stalk during the progress of vegetation, restore to the earth more than is returned by those before mentioned. There are others still, the roots and stalks of which, remaining strong and succulent after the production of their fruits, restore to the soil a portion of the juices they had received from it; of this kind are the leguminous plants.

Many plants that are not allowed to produce seed, exhaust the soil but very little; these are very valuable in forming a system of successive crops, as by introducing them into the rotation, ground may be made to yield for many years without the application of fresh manure; the varieties of trefoil, especially clover and sainfoin, are of this sort.

Principle 5. *All plants do not foul the soil equally.*

It is said that a plant fouls the soil, when it facilitates or permits the growth of weeds, which exhaust the earth, weary the plant, appropriate to themselves a part of its nourishment, and hasten its decay. All plants not provided with an extensive system of large and vigorous leaves, calculated to cover the ground, foul the soil.

The grains, from their slender stalks rising into the air, and their long, narrow leaves, easily admit into their intervals those weeds that grow upon the surface, which being defended from heat and wind,grow by favor of the grain they injure.

Herbaceous plants, on the contrary, which cover the surface of the soil with their leaves, and raise their stalks to only a moderate height, stifle all that endeavors to grow at their roots, and the earth remains clean. It must be observed, however, that this last is not the case unless the soil be adapted to the plants, and contain a sufficient quantity of manure to support them in a state of healthy and vigorons vegetation; it is for want of these favorable circumstances that we often see these the same plants languishing, and allowing the growth of less delicate herbs, which cause them to perish before their time. Vegetables sown and cultivated in drills, as are the various roots and the greater part of the leguminous plants, allow room for a large number of weeds; but the soil can be easily kept free, by frequent use of the hoe or weeding fork; and by this means may be preserved rich enough for raising a second crop, especially if the first be not allowed to go to seed.

The seeds that are commited to the ground often contain those of weeds amongst them, and too much care cannot be taken to avoid this; it is more frequently the case, however, that these are brought by the winds, deposited by water, or sown with the manure of the farm-yard.

The carelessness of those agriculturists who allow thistles and other hurtful plants to remain in their fields, cannot be too much censured; each year, these plants produce new seeds, thus exhausting the land and increasing their own numbers, till it becomes almost impossible to free the soil from them. This negligence is carried by some to such an extent, that they will reap the grain all round the thistles, and leave them standing at liberty to complete their growth and fructification. How much better it would be to cut those hurtful plants before they flower, and to add them to the manure of the farm.

From the principles which I have just established, we may draw the following conclusions.

1st. That however well prepared a soil may be, it cannot nourish a long succession of crops without becoming exhausted.

2d. Each harvest impoverishes the soil to a certain extent, depending upon the degree of nourishment which it restores to the earth.

3d. The cultivation of spindle roots ought to succeed that of running and superficial roots.

4th. It is necessary to avoid returning too soon to the cultivation of the same or of analogous kinds of vegetables, in the same soil.*

5th. It is very unwise to allow two kinds of plants, which admit of the ready growth of weeds among them, to be raised in succession.

6th. Those plants that derive their principal support from the soil, should not be sown, excepting when the soil is sufficiently provided with manure.

7th. When the soil exhibits symptoms of exhaustion from successive harvests, the cultivation of those plants that restore most to the soil, must be resorted to.

These principles are confirmed by experience; they form the basis of a system of agriculture rich in its products, but more rich in its economy, by the diminution of the usual quantity of labor and manure. All cultivators ought to be governed by them, but their application must be modified by the nature of soils, and climates, and the particular wants of each locality.

To prescribe a series of successive and various harvests, without paying any regard to the differ-

* In additions to the reason I have given why plants of the same or analogous kinds should not be cultivated in succession upon the same soil, there is another which I will here assign. M. Olivier, member of the French Institute, has described with much care all the insects which devour the neck of the roots of grain; these multiply infinitely if the same or analogous kinds of plants be presented to the soil for several successive years; but perish for want of food whenever plants not suited to be food for their larvæ, are made to succeed the grains. These insects belong to the family of Tipulæ, or to that of flies. (Sixteenth Vol. of the *Memoirs of the Royal and Central Agricultural Society of Paris.*)

ence of soils, would be to commit a great error, and to condemn the system of cropping in the eyes of those agriculturists, who are too little enlightened to think of introducing into their grounds the requisite changes.

Clover and sainfoin are placed amongst the vegetables that ought to enter into the system of cropping, but these plants require a deep and not too compact soil, in order that their roots may fix themselves firmly.

Flax, hemp, and corn require a good soil, and can be admitted as a crop only upon those lands that are fertile, and well prepared.

Light and dry soils cannot bear the same kind of crop as those that are compact and moist.

Each kind of soil, then, requires a particular system of crops, and each farmer ought to establish his own upon a perfect knowledge of the character and properties of the land he cultivates.

As in each locality the soil presents shades of difference, more or less marked, according to the exposure, composition, depth of the soil &c., the proprietor ought so to vary his crops, as to give to each portion of the land the plants for which it is best adapted; and thus establish a particular rotation of crops upon the several divisions of his estate.

The wants of the neighborhood, the facility with which the products may be disposed of, and the comparative value of the various kinds of crops, should all be taken into the calculation of the farmer, in forming his plan of proceedings.

There is another point in regard to crops that ought to be well weighed by the farmer; though his lands may be suited to cultivation of a particular kind, his interests may not allow him to enter upon it. The more abundant any article is, the lower will be its price; he ought then to prefer those crops of which the sale is most secure. If a product cannot be consumed upon the spot, it is necessary to calculate the expense of transporting it to a place of sale in countries where it is needed.

A proprietor ought to provide largely for the wants of his animals and of the men living upon his estate, before arranging for the disposal of surplus crops; he will then calculate his various harvests in such a manner, as to be always secure of receiving from the earth the means of subsistence for those employed in performing the labor.

An intelligent farmer, whose lands lie at a distance from a market, will endeavor to avoid the expenses incident to the transportation of his products; and in order to do this, he will give the preference to those harvests of fodder or of roots which may be consumed upon the place by his dependants and his animals.

There is another circumstance which must be attended to in sowing those lands which are light, or which lie upon a slope; for these it is necessary to employ snch vegetables as cover the soil with their numerous leaves, and unite it in every direction by their roots, thus preserving it from being washed away by rains, and at the same time protecting it from being too much dried by the burning rays of the sun.

DECREASE OF THE BLACK POPULATION IN THE "FREE STATES."

A late No. of the Journal of Commerce states, as "a curious and instructive fact, that while the colored population in the slave states increases with astonishing rapidity, in the free states it increases scarcely at all. The increase in Providence during the last five years is only 10, and in this city [New York] only 1019, which we presume is less than the amount of immigration from the south during the same period. In Dutchess County there is a decrease of colored population since 1830 to the number of 417; or one 6th of the whole."

The fact that the emancipated negro race in this country has either decreased in numbers, or increased very slowly compared to the slaves, may well be "instructive"—but it is not at all strange. It accords precisely with the laws of population applied to the general habits and circumstances of the negro family. Still, however striking may be the facts cited, they do not present a fair example of the operation of these laws. Where *a few* free negroes only are found, as is now the case in both the northern and southern states, they may subsist, and even increase, as paupers or pilferers, at the expense of the far more numerous industrious, or wealthy part of the community—just as as fragments of the gypsey tribe have lived in Europe. But if half the population of the north consisted of free negroes, or if all the slaves in the south were at once made free, and forced to subsist on the fruits of their own labor, the rate of decrease would be far greater. These anticipated results were stated in a passage in the earliest number of this journal, which will be copied here, as being even more appropriate to this juncture, than when first presented.

"Undoutedly the condition of a slave is deplorable, and it must ever be afflicting that such a state should exist, and be extended so widely over the globe, as to seem to be the inevitable lot of a large portion of mankind. But in our benevolent zeal for the removal of slavery, we should not forget that there are afflictions, numerous, wide-spread, and unavoidable, in the most refined and advanced state of society, that are even more intolerable than the slave's toil, stimulated by the slave-owner's lash. The substance, though not the name of slavery, is to be found almost every where in this miserable world—and the few favored spots now free from such causes of human suffering, must in their turn be visited with like inflictions. Except in newly settled countries, or in others having as yet a sparse population, and plentiful means of subsistence, and a free goverment withal, the laboring poor are slaves in fact, either to individuals, to government, or to their own craving and never satisfied necessities. The negro slaves of Virginia present striking examples of the first kind—the people of Egypt, and emancipated Hayti, of the second—and the entire laboring population of free and philanthopic England, of the third. Of these three kinds, personal slavery, as existing in Virginia, is the most injurious, or the least profitable, to the masters, and attended with the least unhappiness (so far as mere animal comforts are considered) to the slaves; and where hunger is the only task-master, its victims are the most miserable of slaves, and yet compelled to yield the greatest possible nett amount, by their labor, and abstinence from enjoyment. If a rich English manfacturer, or land-holder, was offered all the laborers in his employment, with their wives and children, and all their posterity, to be held precisely as the negro slaves are held and maintained in Virginia, considerations of economy alone would instruct him to reject the fatal gift, as he would avoid certain bankruptcy and ruin. On the other hand, if all the slaves of Virginia were at once emancipated, and left to provide for themselves, want, wretchedness and disease, would make such havoc among them, as to threaten finally, and at no remote period, the extinction of the race. The adult males, and even the females not burthened with children, might possibly do well; but the greater number of the feeble and infirm, from old age, infancy, or disease, would inevitably perish. Marriages would nearly cease, and births greatly diminish, and the work of death proceed as if a general pestilence was raging. The effects of emancipation, in equal time, would diminish the African race in Virginia, more than the operation of any scheme that philanthropy has yet devised, though aided by the general will, and all the the disposable wealth of the country,"—*Review of the Slavery Question &c. p 48, vol. I. Farmers' Register.*

For the Farmers' Register.

A TRIP TO SOME OF THE SEA ISLANDS OF VIRGINIA.*

While in Northampton county for a short time during the last summer, I sought an opportunity to see some of the neighboring sea islands, which have not attracted so much curiosity as to induce many of their near neighbors on the "main" to examine them, though residing within the distance of twelve or fifteen miles—and they are scarcely known to exist, by most persons west of the Chesapeake. These circumstances stimulated me the more to incur the difficulties of making the passage to this almost *terra incognita.* The short time which I had to spare, and the necessity of bringing the trip within the extent of 24 hours, made my excursion more hurried, and the view more cursory, than was desirable.

After all preparations had been made, and we were ready to set sail at the appointed time, a change of wind compelled us to abandon the attempt for that day. The next morning, as it was arranged by W., (whom I had engaged as a guide,) to make use of the early tide, we were all to be on the shore two hours before day break. I thought that this appointment would not be likely to be kept by all—and so it proved. It was day break when we reached the shore, and the tide of the little creek was too low for our canoe to swim. There was no help, but to wait (patiently or otherwise) for the rising tide, which was not high enough for several hours. Even at the early hour when we arrived, the horse which drew our "carry-all' was soon beset by the green-headed flies, which are so abundant every summer as to be the greatest pest of the sea-side, and which are said to be uncommonly numerous at this time. They are seldom very troublesome except during the heat of the day: but now, one of us alone could not keep the horse clear of them: and if the attempt had ceased for a few minutes, the tortured animal, though well used to such attacks, would have broken loose, and taken to his heels. A servant soon reached the place, and we were glad to send the horse away. The dogs during the same time showed by their antics that if they suffered less than the horse, it was only because they had better means of ridding themselves of their tormentors. They were continually biting their rumps, or wallowing on the ground, or running about, as I have seen when one had incautiously poked his nose into a yellow-jackets' nest. These flies in July and August often compel the working horses to be taken from their ploughs by 10 o'clock, and to be kept in their stables until even 4 in the evening. But at this time, it is with great difficulty, and in torture to the horses and mules, that they can plough at all in the day. One proprietor has lately discarded the effort altogether, and for the last week has been ploughing his corn only during the night, for which the moon happened to suit well. He intends (as I afterwards heard from him) to cover his mules in full dresses of old sail-cloth, as the only probable mode of protecting them. These flies are known through all lower Virginia, but are no where numerous, or very troublesome, except on lands immediately adjoining these sea marshes, where they breed in the marsh grass. They are about five-eigths or three-fourths of an inch in length, here as elsewhere. This plague must be a serious offset to the value of lands, and the great advantages of living on the sea-side farms.

Where we were waiting was a tide mill, the pond of which usually was filled and then drawn low every day, and the bottom of which was now becoming bare rapidly. Flocks of sea-gulls were busy fishing in the deeper part of the retreating waters, and some hogs were advancing "in line" through the mud flats, catching shell-fish, or other food left by the tide. Our oarsmen went in for their share of the harvest, and picked up oysters, which were thrown upon a fire prepared for the purpose, and thus soon provided themselves with a breakfast.

Our pilot, and owner of our little vessel, was a regular sea-side fisherman, a sort of salt-water "Leather-Stocking," who was as much at home in the pursuit of his game, furnished by the waters, as the other renowned character was in the woods. His name might have been coveted for the hero of a lady-author's novel: but rough old Charles Dillon was any thing but what such a name would have indicated in romance. In his early days he had been employed enough on ship-board to make him a thorough sailor: but he preferred, and had now long pursued the business of fisherman, varied occasionally, according to his account (though of course *not recently,*) by the more adventurous and spirit-stirring exploits of smuggling and wrecking, but always in a decent and civil way. With all the points of character and of habits which belonged to his station, there were glimpses of better feelings exhibited from time to time, which made him appear to me as one of nature's gentlemen, marred by chance, and the force of circumstances. Taken altogether, there was much to admire in old Charles, and we soon became good friends and cronies. My first

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*It is proper to state that the following piece was written soon after the date to which it refers, and was on hand some time before our receiving the interesting account of another part of the range of islands, which was published in No. 7: which later and more particular statements were sought, and published first, because of the acknowledged haste, and therefore probable incorrectness of of the view of which the sketch was made that is now submitted.—ED.

step in his favor was made by his finding out that I was a member of the Temperance Society—as that gave him what might otherwise have been my share of the contents of the bottle of rum which my companion had brought. Charles seemed to know by a sort of instinct, the state of the tide, even when in his bed. When at last it nearly served to float our boat, he was absent, having gone to his home, half a mile from the water, probably for some "creature comforts" of his own: but while W. was damning him very liberally for disappointing us, he made his appearance—and almost at the very minute that it was first possible to set off.

We started with the rising tide, rowing through narrow channels, bounded by naked mud banks and marshes. The shallow sounds or channels which separate the islands from the main land at this place are far from being open water, as I had supposed. Extensive mud shoals, which are naked at low tide, and not enough covered to be passed over, except at high tide, and numerous marshes covered with tall sea-grasses, fill more than three-fourths of the space, and make the navigation circuitous, and also difficult, to those not well accustomed to the routes. Thus ten miles, which is the nearest distance across the water to Hog Island from the the main, were made fifteen in our morning's voyage, and much farther when returning. The water too, through which the boats pass, is generally shallow, though there are open channels of sufficient depth for large sea-vessels passing between the line of islands and the main.

Our canoe was not so poor a sea-boat as its name would imply on our fresh waters. Though only of little more than twenty feet in length, at bottom, it was stiff and safe, of which we had abundant proof, furnished by the rise of wind before the trip ended. As usual here, the canoe had been sawn open, and widened by letting in a keel, and the sides were raised by laying on a plank to each. It had two masts, and sails, which were brought into use after getting into the more open water.

Gulls are here in great numbers, and of several kinds. This is their breeding time, and their eggs are much in request for food, and are considered a great delicacy. My companions landed to search for them on a marsh island. One kind of gull builds a nest of marsh-weeds on a high tussock. The eggs are nearly as large as those of hens, and quite as large as Guinea fowls'. The wetness of the marsh and my unwillingness to incur unnecessary risk of being make sick, prevented my leaving the boat at this place. The gulls rose in numbers with screams and moans, and accompanied the course and kept over the heads of the plunderers of their nests. It seemed to me at first a shameful act—but it would be difficult to show that it is less justifiable, or less merciful, than taking other living articles of food, as much for sport as for use. Afterwards when I accompanied the egg hunters on a sand islet, I soon entered very earnestly in the pursuit, and was in a fair way of losing all my previously acquired intolerance for bird-nesting.

The largest kind of gull seems to live on the insects or other light substances which float in the foam on the surface of the water. Its dexterity in skimming off its food is admirable. I afterwards observed them flying at their usual great speed, and for considerable distances, the tip of the beak just grazing the surface of the water, and apparently never varying from that precise gage, notwithstand the high swell of the waves required a continual and great alteration of the bird's course. Nothing could be more graceful, or more exact in movement.

We passed near to a large island, called Prouts', which is uninhabited, except by flocks of sheep. We had not time to call. This bears almost no trees; and wherever visible from the water, seemed to be but little else than sand hills very scantly covered with weeds or grass. It was said, however, that in the interior there is much of good grazing land. The north-western part of the island, which we approached, is losing greatly by the encroachments of the sea.

About half a mile from Prout's, and between that and Hog Island, (in Matchapungo Inlet,) lies a newly formed islet, which, with the peculiar felicity which our countrymen exhibit in giving names to places, has been dignified with the name of *Pig Island*. Until within the last ten years, this was only a shoal, which was usually bare at low tide, and sometimes was washed quite away by the fury of tempests. It seems now to be permanent, and will probably grow, by accessions of sand brought by the breakers, until it is a large island. I was particularly anxious to visit this spot—to catch nature in the fact, as it were, of producing land. This, doubtless, is the manner in which all the larger islands were formed in the open sea—and at an earlier epoch, the peninsula (or "main") also. Unless destroyed by encroachments of the sea, (of which there are many evidences, both on the shores of the islands, and on both sides of the peninsula,) it may be supposed that the sand hills, which give elevation to both, will gradually be driven by the violent power of winds and waves, until they spread over the shoals and marshes and make firm land of the space over which we had been sailing. The sand hills, which are formed altogether by the violence of the ocean waves, and of materials brought from the shallow bottom, are higher than any other land, either on the islands or the main—often 30 feet high, and sometimes much more.

It was at high water when we landed on this newly formed island; and it then seemed to be in size, from 25 to 30 acres. It had no where more than two or three feet elevation above the then height of tide. But a few growing weeds were seen—perhaps not a dozen in walking across it to the Atlantic side. And here we may trace nature's operations, not only in forming dry land, but in compounding soil of more or less fertility, out of materials separately barren and worthless. The island consists entirely of pure silicious sea sand, except for the mixture of shells scattered throughout. These, though recent, and of course very hard, were rarely entire, and gave evidence of the power of the water in breaking and grinding them down. Clay then is only wanting to give consistency to the soil, and make it even well constituted. Seeds of various plants will be brought by the winds and by the water. The dung of sea birds first, and next the growth and decay of vegetable matter, will give the fertility wanting. I am told that the shells are seen even at the tops of the sand hills: and if so, there can be no doubt but that they must have been originally thus given generally, though too sparingly, to the whole main land of Northampton—though the ages which have passed have served to dissolve them, and conceal their former existence. The cultivated land in Hog Island, as I afterwards saw, now shows broken clam shells throughout—and the habits of the people, as well as their words, declare that the shells were never put there by the hand of man.

The sandy islet furnished a much more abundant supply of the eggs of another kind of gull—and all newly laid, as one of our crew had "egged" the place clean only a few days before. This kind of gull makes no nest, or at least, it is but a scarcely observable indentation on the sand. The eggs are smaller than those laid in the marsh. I found five nests containing from one to three eggs each, within the space of 40 yards. But as the tide was precious, we could give but little time to the study of world-making, or to bird-nesting. I requested my companion to bring here some of the seeds of the Magothy Bay bean—which will grow well, as soon as any thing can, and perhaps will greatly advance the time when this spot may become habitable.

I was disappointed in one object in visiting this islet. Though there standing on the beach of the great ocean, the water was so smooth that our canoe could have sailed as safely on that side as on the other. The wind set from the shore, and even if it had been towards it, the fury of the breakers would not have reached the beach, but would be spent on the extremity of a shoal which stretched out perhaps a mile into the sea. At that place, calm as it was, the white-capped billows were breaking magnificently, (at least to my unpractised eyes,) and with a continued roar, like the muttering of distant thunder.

We now steered for the landing on the western side of Hog Island. We had several hours to stop here, as there would be no advantage gained by returning before a particular state of the tide. It had been intended to walk across (more than a mile) to the ocean beach—but the fatigue previously incurred prevented, as it was stated that the scene would be nothing more than what was witnessed on the sand islet.

In part of the shallow waters of this sound there was a strange occurrence some years ago, which I have heard stated by several different persons, and which seems to rest on perfectly good authority, as I will repeat it. One of the islanders, named Travis, was out alone in his canoe, "striking" drum fish, in the usual manner, that is, with a spear, or harpoon, attached to a long wooden handle. While pushing over a place where the water was not more than two feet deep, or perhaps less, he came up with a large shark. He struck at him with his harpoon to no purpose, and the shark by its sudden and violent motion caused the man to lose the hold on his weapon. The enraged animal rushed against the canoe with such force as to upset it, and then attempted to seize on the defenceless fisherman. The shallowness of the water only prevented his instantaneous destruction. The formation of the shark makes it necessary for him to turn on one side to seize effectually so large a prey, and this the water was not deep enough to permit with ease. As he, however, with some little delay, grasped the leg of Travis between his jaws, the man, as his only possible defence, thrust his thumbs into the eyes of the monster, and kept them there, pushing himself off by the pressure and support, while the shark continued to nip his leg and thigh, and to make numerous wounds. Still he was not able to use his force effectually, and at last, let go and fled from his gouging antagonist. The man instantly righted his canoe, and jumped in, just in time before his enemy returned to the attack. He did not however again strike the canoe, and indeed his upsetting it at first was probably the effect of accident more than of a designed assault. The water, baled out of the canoe from time to time, was reddened with the man's blood, and served as a bait to draw on the shark, and keep up the threatened appearance of a renewed attack. But grievously wounded, and worn out with exertion as he was, and followed closely by his awful attendant, the fisherman was just enabled to paddle his canoe to the shore, and fell on the beach exhausted by loss of blood and fatigue. He received speedy aid, however, and sustained no permanent injury from his numerous flesh wounds.

On all the maps of Virginia, previous to the late one published by the state, these sea islands are represented very incorrectly, and as far smaller than they are. Very few persons, even in lower Virfiinia, know any thing of them—and the publication of the large new map has not served to remove existing errors on this subject, though it shows more size in the islands, and of distance from the main land. By the way, this map, with all its pretension, deserves but little credit for correctness in other places, and probably is even still still less to be relied on as to this region. In truth, the inlets, or passages between the different islands, are not distinctly seen any where from the main—and from thence the line of islands completely shuts out all view of the Atlantic. From these circumstances, and the difference from the older maps, it might be supposed that the land was gaining on the ocean, and the islands increasing in size. But it is understood that the reverse is the fact—at least as to firm land. The low marshes, which border all the islands next the sound, probably are increasing, and may in time fill up much of the space now covered by water. But it is believed that the ocean is encroaching on the eastern side—throwing sand hills in advance of its progress, and then sweeping all away. Numerous stumps of trees are said now to be seen in the shallow waters, left naked only at low tides: and on Smith's Island, the brick foundation of a house may be seen in the sea at some distance from the shore.

Hog Island contains several thousand acres. Eleven families reside on it, and live (as it appeared) in great comfort, on the returns of their fishing, and small amount of tillage. I visited several houses, on separate little farms, and was much pleased with the appearance and manners of the people. They were very civil, and kind in manner, without the least appearance of servility, or impertinent curiosity or familiarity. Every attention was offered that could have been desired, and nothing that was obtrusive or disagreeable. Indeed in the true and proper sense of the word, I have no where seen a more *polite* people than these plain and simple islanders. Hospitable they are in a high degree, and no doubt moral, and correct in conduct, according to their notions of right and wrong. It must be confessed that they have never accounted smuggling and wrecking (in a decent way) among the things prohibited by the decalogue—but rather consider the opportunities for both as among the bounties of Providence, which are to be enjoyed temperately and thankfully. But the want of capital prevents smuggling almost entirely, notwithstanding the great facilities which the islands offer: and the erection of the light-house on Smith's Island, has almost put an end to the wrecking business, both lawful and unlawful. The strong inducements which the existence of high duties on manufactured commodities, and the peculiar features of this coast, held out to smuggling, have been but little availed of, compared to what might have been expected. If that means of breaking down the tariff for the protection of manufactures had been seriously resorted to, there would have been no need of the "compromise," nor of any other remedy. All the American naval power could not enforce here the execution of highly oppressive revenue laws, if there was a general wish to elude them—and it is some consolation that even *that remedy* is left, should there be a return to the prohibitory system, and a determination to destroy the blessings of free trade, for the benefit of particular favored interests.

Most of this island is covered with wood—some pine of small and worthless growth, and much cedar of great value as durable fencing timber. Much of this is carried to the main, for posts. The price of land here is as low, as it is high on the main. I heard of about 80 acres having been recently bought for less than 50 dollars, and from which more than that value in cedar posts had already been taken. The best of the cedar timber is said to be of a more ancient growth, the trees having been prostrated, covered by the sand hills, and now again laid bare by the encroaching sea. Whether from the nature of the soil, or from being afterwards saturated with salt, (as some think,) this timber is almost indestructible by time and exposure. But the modern cedar growth is of much less value, as if the soil had ceased to be favorable. With a view to the sending of cedar timber to the New York ship-yards, a northern man bought, and still owns, a large part of this island. for $3000—which perhaps is ten times what it would now sell for. The expenses of transportation had been so great as to disappoint the expectation of profit.

The soil of Hog Island is the most sandy that I had ever seen under cultivation. It is dry, and I saw no land moist enough for good grass land, except the marshes, which are subject to be frequently covered by the tide. The growing corn generally looked well: but when so speaking of it, I was reminded by the owners, that if a drought came, the crops suffered greatly more than any where else. They do not make oats, (or but rarely,) considering that crop most injurious to the productive powers of the soil—but suffer the land to rest one year between each two crops of corn. The Magothy Bay bean covers the land during this year of rest, and was then far more forward and luxuriant than on the main, where oats had preceded. It was here (on July 12th,) knee high, where best, and it is said will rise to three and even four feet hereafter. This might be a good manure crop for the land: but the owners seem to have no view of any such matter, and rake together and burn the dry remains, wherever in the way of their small ploughs. The moving sand-hills are gradually covering up and thus destroying the fields on the sea side. This might be arrested here and elsewhere, by planting the sand-hills with such trees or grasses as will grow on loose sands, as has been resorted to with success on the sea coast of France.

Miserable as may be the tillage and present products of this and the other islands (and on several of them there is no attempt at cultivation) I think that a proper selection of crops, and attention to the peculiar character of the soil and situation, might show that there exists a value, as yet unsuspected. The soil and situation (except as to latitude) agree very nearly with the sea islands of South Carolina, which are the most valuable of all the lands in the south—selling at from $250 to $300 the acre. Could not the same cause of value be found here, at least partially, by cultivating the fine sea island cotton? But if that culture is forbidden by want of sufficient warmth of climate, (which is far from certain,) there are other vegetables suitable to sandy soils, and some to saline soils, which might here be found profitable. The growth of every thing is said to be much more forward on the islands than on the neighboring lands of the peninsula—as much so perhaps as on inland situations 200 miles more south: and the vicinity of, and speedy navigation to the markets of New York, and other northern cities, added to the more early maturing of all vegetables that can thrive on the islands, would give to their cultivators double the customary prices for every product. But the good people seem not to have any thought of agricultural improvement, and wait with calmness and resignation for the gradually advancing sand hills to cover their still remaining cultivated fields. It would be a good speculation if a company would buy up some of the extensive and almost desert islands, and improve them for stock raising, if for nothing else. For this purpose but little would be wanting except to introduce suitable grasses, and to guard the stock from sea-faring thieves. If improvement for tillage was attempted, the adjoining marshes would supply both mud and vegetable matter in any quantity for manure, serving both to stiffen and enrich the soil.

Musquitoes here are so great a plague, that the report of them alone was enough to limit my investigations to day light. But a worse evil is the bad quality of the water for drinking, which stands in the wells at about four feet only below the surface of the earth. Wells are dug with a sloping side for the cattle to walk down to drink in dry weather. Hares are very numerous and injurious to the crops on Hog Island. There are no squirrels. It is known, by tradition, that some particular wild animals were formerly brought from the main, and turned loose to breed: and without such an origin, it would be difficult to conceive how any came here, that could not fly or swim from the main land.

In 1821, a storm produced so great a rise of tide, that this island, and all the others, were covered by the sea, except the more elevated sand hills. All the cultivated land was covered. The site of every house, on Hog Island was waist deep in water. Here and elsewhere most of the stock were drowned, and some few persons also, on Smith's Island.

There are no slaves, nor any other than white persons on Hog Island. In making inquiry on this head of a very decent old man, at whose house we took dinner, I found that some of the islanders still own slaves, though they hire them out on the main, in preference to working them at home. He said that he had had the use of the last two slaves which had been on the island, but he found that they "wanted so much waiting on," that he was very willing to get rid of them. "They were lonesome here," he added, "as there were no others of their color, and I returned them to my father-in-law, to whom they belonged, that he might hire them out, as they wished, on the main."

On a shelf in this old man's neat log house, there lay a large new bible, to purchase which must have cost him the net income of his little property for some weeks. A newspaper, which had been brought as a wrapper to our victuals, was eagerly seized on, and read with such interest by several members of the family, that it induced me to think that here might be made a new and useful disposition of some of the religious tracts with which the good ladies have so glutted the market elsewhere. * * * * On inquiry, I heard that none had yet reached Hog Island.

Near the habitation, I observed several gourds hung up, with a hole in each, like those designed for martins to build in, but which were much too small for their use. They were intended for, and were used by wrens. My old host said he had been induced thus to accommodate them, because so scarce were hollows or suitable places for their nests, that they would often commence building where their labors were sure to be in vain. Sometimes, after having hung his jacket on a tree, while at work, he had found that a wren had commenced to build a nest in the pocket, or sleeve.

We left the island precisely at the time which would make the courses of the tides most favorable—and there was now a high wind which,though not quite fair, permitted a sail to be used, (and one was as much as the boat would then bear,) for the course through the most open water. The waves ran so high, that if I had suddenly found myself in such a situation without preparation, I should have thought that our best chance would be the chance of swimming. I am not much afraid of water, (for a landsman,) but have always deemed sail boats the most dangerous of all vessels. Yet so fast had my confidence in our pilot grown, that I felt perfectly at ease, while our little craft scudded over the waves, which once in a while meeting her bow, would throw a shower of spray over all her crew. The ordinary, and always proper precaution, of the line attached to the sail being held by the hand, so as to be let go when an upsetting blast of wind strikes, was neglected—and the line was tied down fast, as soon as each new course was taken. This produced a strong proof of the stiffness of the vessel, or of the good luck of its commander. We had barely escaped striking on the extremity of the wide shoal extending from the land which "rejoices in the name," of Rogue's Island, and had taken our proper course, when the wind increased so suddenly that the mast snapped close off, and that alone prevented the whole being capsized. The sail was caught and saved, as it passed by the stern—and the men barely had time to seize the oars and prevent the boat striking on the shoal to which it was drifting rapidly, and where it must have upset as soon as it struck, from the roughness of the sea. After this, we raised the other mast and sail, and our course through the water seemed to be rapid, and the passage delightful: but the course was made so circuitous by the state of the tide, that night arrived while we had still a long way to go, and along the creeks or channels between crooked marshes. To mend our prospect, it was very dark, so cloudy that no stars which could direct the course could be seen, and a thunder storm, with rain, was strongly threatening. The wind was now dead ahead, so that the oars were the only help, and my umbrella could not be hoisted, however desirable it might be, as it would be too great an obstruction to our progress. A strong argument now arose between W. (who also pretended to much seamanship,) and the pilot, as to whether the wind had shifted its direction or not—and uncertain as that was, the direction of the wind was the only guide to steer by. Though the marshes, (now so covered that the tall grass only was above water,) were on each side of us, it was too dark to see them unless very near, and we often rowed into the grass before it was seen. The boundary too of such marshes is so irregular, that steering close by them would make the distance more than double the proper course, and might the more certainly mislead, by the many and abrupt changes of direction. I gave up the matter—though silently, as I did not wish to discourage effort—and thought it was utterly impossible to find the way through such difficulties. I counted on nothing better than spending the night, anchored among the marsh grass, and with the addition of heavy rain. The violence of the wind had kept the musquitoes still, as yet—but if it should fall calm, they would be worse than every other annoyance. However, we tugged on,slowly enough,against strong wind, and partly against tide also. The rain at intervals began to patter, but fortunately it came to nothing worse. At last, from some more prominent features of the marsh and water, it was ascertained that old Charles' instinct had not failed him, and after seven weary hours of sailing and rowing, we touched the shore. The carriage which had been ordered to meet us at dark, had very properly been carried back,and we had a midnight walk of a mile and a half to my lodgings. Fatigue had kept off hunger, and left nothing wanting but rest.

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Soon after returning home, I met with my good friend Mrs. ———, who had recently made a tour to the north, and who gave me an amusing account of what she had seen. In return, I told her,that much nearer home,I had met with things, or had been correctly informed of their existence, far more strange: as for example—of the commonwealth of Virginia having desert islands in the Atlantic Ocean, and others well inhabited, where the gospel had never been preached—of there being on one (Chingoteague,) a breed of real wild, but diminutive horses, which lived on sea grass, and would almost starve on corn and good fodder, and which were caught by throwing the *lasso*, in South American style—of sailing on the Atlantic in a canoe—of sea birds' eggs used as ordinary food—of wrens building nests in men's pockets—of a shark being beaten in single combat, by gouging, &c. All this list of marvels was pronounced to be an attempt at *hoaxing*—and Mr. ———, who heard the conversation, (and who moreover prides himself, on being an excellent general geographer,) even denied that there were any such islands existing. This was giving me so much less credit than Gulliver's Travels received from the English bishop, who declared that he "did not believe that *more than half* of what they contained was true," that I determined to lay my day's observations, trivial as they may be, before the readers of the Farmers' Register—furnishing the editor at the same time with a reference to a proper source for information as to the most interesting point, in relation to the "beach ponies," or wild horses of Chingoteague Island, of which I know nothing except by report.

EXTRACTS FROM A FARMER'S MANUSCRIPT NOTES.

[The accounts received at different times, and from several sources, of the author of the following communication, induced us long ago to invite his correspondence, with as much urgency as propriety permitted—and it is hoped that the general and desultory observations now furnished, are but preliminary to more full and minute statements of the separate parts of Mr. Walker's admirable and most successful practice as a farmer, as well as of his theoretical views of agricultural improvements and interests.

It is not our habit to refer personally to our correspondents, or to remark on any thing relating to them, except the communications before us—and even these are generally left to speak for themselves, and to make good their own claims to notice. If in the present case we depart from this usage, it is because of the peculiar situation of the individual, his well established and high reputation at home, as a farmer, and his being entirely a stranger, even by report, to nearly all of our Virginian readers. We understand that Mr. Walker is a farmer thoroughly trained by education in Britain—and by practice there and in this country—original, perhaps eccentric, in his modes of thinking and acting, but the general results manifesting that his departures from ordinary courses, are guided by correct reasoning, and sound judgement. Careless or regardless of the censure or the ridicule which may be always expected in such cases, he has in no way tried to justify the correctness of his views, except by their practical results—and by these best of proofs, his theories have been most generally well sustained. We have been informed by a highly intelligent correspondent, who recently visited the farm of Mr. Walker, that it exhibits most strikingly all the beauty of appearance, and of utility, that might be expected from the highest grade of agricultural skill, and industry—and that its owner is equally remarkable for the singularity and oddity of his opinions and manner. He left his native country on account of preference for the political institutions of this—but notwithstanding that general and very decided preference, feels strongly, and expresses freely the defects in our policy which obstruct agricultural and economical improvement. So far as we now see into the politico-economical creed of the writer, it does not accord with our own: but we are not on that account, (and we hope that such is the case with all our readers,) unwilling to listen to the opinions, however opposite, of any enlightened and sincere friend of agricultural interests.

Concise as are the statements on practical farming, there are two points which, (as tested by Mr. Walker's successful experience,) deserve especial attention—viz: the application of putrescent manures as much as possible to grass crops—and always on the surface. Both of these practices are still but little extended in this country—and had been scarcely heard of by most of our readers a few years ago. But they are strongly sustained by many facts, as well as by sound reasoning, presented in many previous parts of this journal—and we doubt not that by their general adoption, a revolution, and a most beneficial one, will soon be produced in the agriculture of this country.]

LETTER FIRST.

To the Editor of the Farmers' Register.

Holmesburg, Philadelphia County, Oct. 12th, 1835.

Inclosed I send you five dollars—my subscription for the present volume of your Register—and I beg you to accept my very best thanks for the 1st and 2nd editions of your work on calcareous manures—in my opinion, one of the *few* works upon agriculture of any great value *yet* written. Indeed I am confident the day is not very far distant, when it will be found, that nearly all the existing works upon agriculture are becoming worse than useless, and with them will fall the existing theories of population and food.

I have read your account of the formation of prairies with the greatest satisfaction. This great and important discovery must ultimately lead to vast results, in the improvement of the soil. How *nature's* school has hitherto been most strangely avoided and despised by farmers!—*and there they must acquire all their learning and all their knowledge.* But all improvers and discoverers in agriculture must be content to say of themselves as Lord Bacon did of himself, "I am the servant of posterity." You do well to hint at the *ignorance* of the *learned.* They name and catalogue things—measure buildings and ruins—describe cities, castles, scenery, pictures, statues, costumes, military accoutrements, courts and nobles, and enumerate armies, taxes, population, &c.; but *the laws of nature*—causes and effects, they leave much as they find them, or rather, they find very few of them.

I have been intending a communication to you for some time, but I am very dilatory with the pen, and my time is otherwise much occupied. I now send you a few extracts from my notes—just written as the thoughts occur—endeavoring to follow *nature*—the teacher whom farmers and most others have only occasionally *condescended* to notice since the creation. My views are—that man was formed to subsist upon animal and vegetable food in certain proportions; these proportions varying from the equator to the poles: and that the laws governing the full, perfect and increasing production of food, are exactly in accordance with the laws of this organization. Therefore as man most duly observes this, the Creator's law of his subsistence, so does the production of food increase with increase of population—and by no other means; simply because it is not otherwise required; as man departs from it—so does the production of food decrease with increase of population—the latter going on to a certain extent, and ultimately followed by rapid decrease of population, as the soil becomes more and more exhausted. Hence the *real* cause of the "decline and fall" of Rome, and of all other ancient empires, and the declining and stationary condition of many modern ones. You have this sad transgression in operation in the south—the emigration to the west relieving you from its final and worst evils. It exists least in the north and is rapidly decreasing since the establishment of manufactories—the *true* stimulus to correct agriculture. The departure from this law exists to a frightful degree in Ireland, India, &c. Hence the *real* source of their misery, and *apparent excess* of population. In England, the rates of wages have raised parts of the *mass* to the *bread and meat power of subsistence—in the United States still far more*—and hence the *real* main essential source of all the prosperity, and consequently, of their advancement and civilization above all other nations. *This power* is now at work in France—and hence her progress since the revolution. Malthus certainly could not have known any thing of these principles, or he never could have arrived at the conclusions he did: hence (to me at least,) his very obvious, great, and sad errors. His conclusions are formed upon the facts of *decreasing* production of food, arising from tribes and nations failing, in their past and existing ignorance, to subsist according to the organization of man, and consequently, from not cultivating the soil, in accordance with that organization, which are, and *must* be the true and only principles of increasingly productive agriculture. It can scarcely be deemed possible that the breaking two of the primary and most important laws of man's nature and condition, can be amended and remedied by breaking a third—still more important, which commands his very creation!!!—and the most directly imperative of the three!!!

With these views, arising from various circumstances, and from observing the *difference* in the condition of the *mass* in this country and my own, (England,) and from a good deal of reflection upon the theories and doctrines of the *existing* school of political economy, and from some observations and study of the workings and operations of nature's laws, I set about the practical application of the above principles. I began with the English system of agriculture in the first instance—which I studied, and not idly, under three of the best farmers in England and Scotland. *Perpetual* tillage with *occasional grass* crops—as clover, &c. intermixed, and *separate perpetual* pasture. This boasted system, being that of England, Flanders, &c.—with the exception of its arable green and root crops for cattle, does not essentially differ from the agriculture of the earliest, rudest, and most ignorant stages of society, succeeding the mere hunter and pastoral stages—such is the slow progress of this science, upon which all human existence and civilization depends! *This system does not produce and fill the soil with a sufficient quantity of vegetable matter*—the primary, main essential source of all *fertility* and *permanent* and *increasing fertility*—(you have most ably and clearly shown in the last No. of your Register, the direction lime gives to that fertility upon the great scale of nature's works—) and I found it would not do either on the score of production or expense. This system mainly grew up under *war* prices and comparatively *low wages*—the latter, the curse and bane of all good agriculture—of manufactures, and every thing else, universally important and beneficial to mankind.

My farm is now not two-thirds grass, and something about one-third tillage; one, two, and three years grass and clover—alternating with one and two years only of tillage, with no *permanent pasture*. I do not pretend to say that these are the exact proportions according to the *organization of man*, as to his due and legitimate mode of subsistence; but I believe they are a close and correct approximation to it in *this latitude*. I formerly employed four to eight men, one boy, and seven horses; now only one man and two boys, and one and two other men occasionally—more of course, in harvest—and four horses often idle. The more perfect and productive *agriculture* becomes, the fewer hands it employs—the reverse of all other professions—thus leaving the *surplus* (not excess,) for those professions—yet supporting all. Otherwise improvement and civilization could never take place. The *worst* agriculture the *attendant* and *result* of the lowest rates of wages, employs nearly a whole population—otherwise excess of population would be frightful indeed, there being no demand for manufactures, &c. under such deadening circumstances. I have six large barracks and three barns, all full—the latter 50 by 34, 40 by 32, and 80 by 40 feet. Next year I must build again, and I believe I shall continue to do so for several years to come. My farm is barely 100 acres—the soil a light hazle loam, of medium powers, deposited upon gneiss rock, with a white and yellow clay resting between—the latter perfectly permeable to water—the former not so much so. Thirteen years ago when I purchased the farm, it was in the lowest state of impoverishment and exhaustion. I have purchased 8000 bushels of bones, and above 5000 bushels of lime—a good deal of straw, and not much manure. Now I sell all the hay and grain, excepting what the horses and four to six hogs consume, and all the marketable straw. I keep only three to six cows, and manure from 25 to 30 acres, besides ploughing up from 28 to 32 acres of clover and grass sod annually. There is neither hoax, falsehood or mystery in all this. If others will follow nature as I have endeavored to do, they may accomplish a great deal more than I have yet done, upon much better soils, and with much more favorable local advantages and circumstances than I possess. I use about 150 bushels of gypsum, and 400 of lime yearly. I manure no crops whatever but the grass, and that upon the surface, and always in its infant state. If this is not a law of nature, we know not one of them yet. Go into the woods and prairies, and foul fields covered with weeds, in the fall, and see if it is not so. I lime no crop excepting grass, and in its infant state, at the rate of 10 to 15 bushels per acre (slaked under cover,) about once in three years, or as I see the sorrel come. We have guides and directions in profuse abundance if we will learn and look for them. I formerly thought the farmer had to blunder out and stumble upon his knowledge, in the best way he could, by long, tedious, painful and expensive experiments. It is a great error and mistake: the laws for his guide and observance are as marked, distinct, and simple, as those for the mechanician, only far more multifarious—and their truth is not quite so soon ascertained.

I apply manure, lime and gypsum, at leisure times upon the grain stubble, young clover and grass, in the fall—late in the winter—or early in the spring—so that there is no interference whatever with the very short and most important of all periods, seed time and harvest. The exact due times of sowing and planting each crop are so soon passed over with the crops duly varied and proportioned to each other, that I consider this fact alone as conclusive proof that any operation at these times, excepting those of the plough, harrow, and seed bag, or drill, is contrary to the laws of nature—therefore none others were intended to be performed at seed times, when the crops are manured, limed, &c. Upon no farm in any country is the whole sowing scarcely ever accomplished in due season—particularly, as upon no farm are the crops yet duly proportioned with each other.

In England, the turnip husbandry is the main and essential support of the yet (there as elsewhere) almost exclusively separate and perpetual arable farms—and this most important crop (the foundation and support of England's prosperity, civilization, and wealth,) being always manured, it is made a most expensive, severe, formidable, and tedious operation—and the manure being applied only once to the soil in the whole year, a great deal of it is lost by the rains and fermentation, and the last sowed turnips are generally put in so late, as often to be not bigger, as the Scotch Lord of Session said of his own crop, than "*golf haws.*" In wet seasons the operation of manuring ploughed land is dreadful and hideous, and the delay and mischief are greatly injurious. By my practice, all this, and the great cost of making and hauling compost and manure heaps two or three times over, and the immense waste from fermentation, are saved. By top dressing the grass in its infant state, and in one, two, and three years ploughing up that sod and rotting it, I get better crops of all, and at far less expense than formerly.

In no instances whatever, are the laws of nature so broken, outraged, and neglected, as in the consumption of food—or rather non-consumption in most countries—and consequently in the production of it: and until these laws are duly and perfectly observed, no other laws (of nature) can be so—that is, likewise duly and perfectly. The former laws are best observed in the United States—hence its rapid and matchless progress. The observance of the latter is only retarded by the occupation of the western lands. Freedom and excess of land (or rather the soil being unoccupied) have here produced precisely the same effects—exhausting thesoil, but only temporary—which despotism and low wages have produced in other countries, likewise only temporary.

A writer in the Philadelphia National Gazette of September 4, in speaking of your *Essay on Calcareous Manures*, says: "The agriculture of our country is on the eve of a revolution more important and glorious in its effects upon the wealth, intelligence, physical beauty, and moral grandeur of our stupendous land, than ever was, or ever will be exerted by the great power that the intellectual energies and indefatigable enterprise of man have ever made subservient to his use." With this opinion, as the members of "deliberative and dignified" assemblies, parliaments, &c. say "I entirely concur"—in what the dignity of those bodies consists I cannot say—but I think they generally deliberate to small purpose. It is not the arbitrary laws of man which improve the condition of man—for if they did there has been enough of them, such as they are, to have made him perfect long ago. No, they will not do—we want the developement of the laws of nature in agriculture, manufactures, commerce, education, knowledge, &c. with as little parliament as possible. Parliament law is a poor substitute for knowledge. This by the way—as the good old Dr. Coventry used to say in his lectures.

What deplorable and frightful descriptions of the state and condition, and consequently of the morals of the people, do the reports of the parliamentary commissions of inquiry present in England in part, and in Ireland throughout! All remedies for which are nugatory and vain, without higher wages and better agriculture preparatory to all others, so that the people may procure food, clothing, and habitation, more in accordance with the laws of the organization of man. If a legislator does not understand these laws, all laws of *his* making can, and will do little but mischief. The Malthusian and other doctrines of the existing schools of political economy and *philanthropy* are the worst and most mischievous possible. France put them in operation in 1789! Whilst in England the introduction of the turnip, (for it is not a native,) with the great discoveries of Bakewell, Culley, Dawson, &c. and Arkwright, Watt, and others, all combining to raise wages, and increase and elevate the demands and means of subsistence—raised that country to its present power and civilization, and *may*, and probably will, save it for ever from the horrors of revolution, in spite of all the vast evils and errors of hereditary and conservative legislators!!

Without the existence of the means and powers to develope the natural powers and resources of the soil, there can be nothing but misery and destitution, and if what is produced is exported for the benefit of a few, or for absentee landlords to more fortunately situated countries, that destitution and misery are extreme, and finally reach all—for with low wages the people cannot consume, and what they produce under those circumstances only exhausts the soil. The wants of man must be fulfilled—for as Lamartine most truly observes, "Providence never creates wants without at the same time creating the means of satisfying them." But I am rambling into political economy, and forgetting farming—but they are inseperably interwoven and connected together.

I have more of these notions, if you like them, and some on wages, one of the most important of all questions, now beginning to excite attention—and some on the purposes and use of weeds—and some observations upon the present slavery question. My firm conviction is, that the conservative powers in Europe are at the bottom of it. There are many very suspicious circumstances tending to prove this. Amongst others, Sir Robert Peel's extreme idiotic (impossible) ignorance of this country and republicanism, in his late speeches, (pretended ignorance of course.) I believe Thompson is one of the agents, and Tappan, and others, honest fanatics—of course, their tools. The indemnity question is another part of the mischief going on. We shall have something else to do, by and by, than quarrelling with each other. I am not quite sure that Judge Lynch is not in a great degree another agent—as General Lud and other worthies were known to be agents of Castlereagh's and Sidmouth's administrations. When mischief suddenly and simultaneously breaks out in various parts of a country, sinister agency is always at work in such cases. There can be no motive in the present times in this country for any domestic agency of this kind—but there is a most powerful one in Europe at this time. Don't let us quarrel with each other—for rely upon it the enemy is in the camp.

GEORGE HENRY WALKER.

LETTER SECOND.

To the Editor of the Farmers' Register.

November 7th, 1835.

You appear to have been led to believe that I keep a sort of agricultural school; God forbid I should ever do any thing of the kind. I never had more than six pupils at one time—and this is three too many. I never wish to have more than two. You ask for some account of my method of instruction. This is soon told—for I consider education a very simple and a very easy business. First, I endeavor to take no young men but those who have a *decided talent and taste* for the profession—(and here is the whole business and secret of education in every profession—for no one can any more make a youth into a farmer, or any thing else, *who has no talent and taste for it*, than *they can make* turnip seed produce pine apples—) set before them all I know—and *force and cram nothing*—(for this will no more succeed with the human, physical, and mental faculties, than with vegetation—) make friends and companions of them—and if they have the sense, zeal and ambition to ask and observe and learn the *whys* and the *hows*, all will be right without trouble or difficulty to either party. Of my success, it is impossible yet to speak. My pupils are all young men; and agriculture is a slow process; and several of them have not begun operations. * * * * * * I most strenuously object to all education *apart from constant, direct and immediate female society, care, superintendence and control.* For this, with other reasons, I consider boarding and manual schools, colleges, orphan asylums, &c. as the worst and most pernicious of all systems and institutions; and the Girard College so much lauded, as the worst of them all; and the latter as wholly unnecessary in *this* country. I have now four orphans in my house, and am happy to get them—two boys and two girls—the youngest only four years old.

I think the less *legislative* action and interference there is, in most instances, the better. Perhaps one of its most useful and legitimate duties would be to reward those discoverers and inventors, whom the benefits of patents, copy-rights, and just and immediate profits, cannot reach. It would greatly stimulate exertion and industry, and be quite as just to individuals and beneficial to society, as giving *swords and grants to military men only.* The discoverer of any great law of nature is generally the least benefited by it. Arkwright and Watt, from peculiar and favorable circumstances, were exceptions.

The education of the *head* and *hands* must always go together, or the health, strength, and efficiency of the physical and mental powers of man can never be duly developed and maintained. The education of the latter ought unquestionably to take precedence of the former. As to *time*, the *morals of both* and the education of the *heart* to be attended to from *infancy*. Men whose heads are educated, and not their hands, are too often only upon a miserable par, in deficiency of common sense and power and capacity of action, with those whose hands only are educated. Mental and physical education being kept apart—and the latter often wholly neglected—render men and women as inefficient and useless, (as Franklin said upon another occasion,) as a pair of scissors are without the rivet.

I think you rather hint an objection to connecting agriculture and political economy. You must permit me to write as it comes, or I cannot write at all. Besides, we cannot investigate the highest subjects without descending to the lowest and the meanest results and operations. The finest building owes its strength and durability to paltry nails and dirty mortar. So the sound, universal, and permanent prosperity of a nation depends upon how many *slices of beef, pork and mutton the people eat* with their *bread* and *potatoes;* and what is the use of discovering the best system of agriculture, without showing what is necessary to *permit* its establishment?—and under what circumstances it can, and cannot be established—otherwise this would be as mischievous as placing great wealth in the hands of a man without educating him in the proper care of it. * * *

G. W. WALKER.

OLD PRACTICES AND NEW DOCTRINES.

To the Editor of the Farmers' Register.

Cypress Spring, Essex Co.,
November 25th, 1835.

In your last No. I made some remarks relating to the Twin Corn, and had intended measuring a small lot which I had growing near my house, but the fowls and four or five shoats, which were continually upon it, made such havoc, that I have declined it. Suffice, however, to say, that I think it will yield more to the acre than any corn I have ever cultivated.

In this, our enlightened day, it is surprising how slow is the march of improvement in agriculture in some parts of our county. Although there are many, very many good farmers in our county, yet there are those who do not in the least profit by their example, and who are still following the *good old way* of their fathers.

Not long since, riding in the field of one of my neighbors, I saw his laborers engaged in spreading manure (for this article is sometimes used with us) with their hands, while another was cutting up straw with an axe, on the end of a cider trough, for the want of a cutting-box, now so cheap and common among us. Upon inquiring of my good neighbor why he did not use manure forks, he replied he had none, and did not even seem to know such things had ever been invented. Time saved is money gained. I am sure more work of that kind can be done by one hand with this implement, than by four without it.

One of our merchants brought on some of these useful tools, and had actually to sell them to a farmer who knew their use, at, or for less than cost—because, as he said, they were a dull article. Our county abounds in the very best marl; but unfortunately for us, "it is so heavy we cannot cart it upon our lands: it will kill our teams, and break our carts." Sometimes your paper is borrowed, but it is not generally believed that while our farms (the farms of our neighboring *big fish* on the river excepted,) do not yield us more than from one and a half to two barrels of corn, and three or four bushels of wheat per acre, there can be land made to produce the *enormous* crop reported by some of your correspondents. Do, for the sake of us *small fish* in the forest, insist on your correspondents in future, when they feel disposed to give any thing in the *big way*, to sign their proper names to their communications, or they will not be credited, at least, by us foresters—for our faith, like our land, is weak.

P. G. DERIEUX.

ON PREPARING GYPSUM FOR USE, BY HEAT

To the Editor of the Farmers' Register.

Prince Edward, Nov. 26th, 1835.

The comparative merits of burnt and of ground gypsum for agricultural purposes, are thought by some to be as yet unsettled in the Register. The experiment of your contributor from South Carolina was, however, to my mind, quite satisfactory. Having lately read a translation of Chaptal's Agricultural Chemistry, which probably not many of your readers may see, for some time to come, I will transcribe a page or two, giving the practice in France, and his views on that subject.

"The use of plaster or gypsum, which has become common in Europe as a manure, is one of the most important improvements that has ever been made in agriculture. It has even been introduced into America;* where it was made known by Franklin upon his return from Paris. As this celebrated philosopher wished that the effects of this manure should strike the gaze of all cultivators, he wrote in great letters, formed by the use of the ground plaster, in a field of clover lying upon the great road leading to Washington, "This has been plastered." The prodigious vegetation which was developed in the plastered portion, led him to adopt this method. Volumes upon the excellencies of plaster would not have produced so speedy a revolution. From that period the Americans have imported great quantities of plaster of Paris.

"There are, however, some tracts of country where the use of plaster has been attempted without success. But this arose from its being one of the original constituents of the soil, which derived no advantage from the addition of a new quantity. The existence of this salt, naturally, in those lands upon which plaster produced little or no effect, has been proved by analysis.

"Gypsum is a compound of sulphuric acid and lime, containing more or less of the water of crystallization. A moderate heat deprives it of its water of crystallization, and renders it opaque. It can then be reduced to powder, and employed in that state. Though the prepared gypsum absorbs water with avidity, and its consistency is affected by the mixture, it may be preserved many months without its properties being sensibly affected. Nothing more is necessary for this purpose, than to head it up in tight casks.

"Gypsum carefully broken is likewise much used; and there are some farmers who attribute to it the same efficacy as is possessed by that prepared by heat. I have myself made some comparative experiments, and observed, that the baked plaster evidently produced a little more effect the first year, but during the three years which followed, the difference was almost nothing.

"The gypsum is scattered by the hand atthe time when the leaves of the plants begin to cover the ground, and it is best to take advantage of a light rain for the operation, as it is thought to be beneficial to have the leaves moistened, in order that they may retain a small portion of the powder.

"The effect of the gypsum is perceptible during three or four years. The use of it can be resumed at the end of that time. The quantity in which it is usually employed is from $2\frac{3}{4}$ cwt. to $3\frac{1}{8}$ cwt. per acre.

"Much has been said upon the effects of plaster. Some have pretended that its action ought to be attributed to the force with which it absorbs water. But it solidifies that liquid, and does not part with it either to the atmosphere, or to any other surrounding body; so that this doctrine does not appear well founded. Besides, if its action were from this cause, it would be momentary, and cease after the rains; and this is contradicted by experience. Moreover, it is believed, that the broken gypsum has not the property of absorbing water, and yet it produces nearly the same effects as the baked and powdered plaster.

"Others have thought that plaster acted only by favoring the putrefaction of animal substances and the decomposition of manures. But Davy has refuted this opinion by direct experiment, placing it beyond a doubt, that the mixture of plaster with manures, whether animal or vegetable, does not facilitate decomposition.

"There are others again, who attribute the effects of plaster to its stimulating property; and these adopt, in its utmost extent, the opinion which I have formed on the subject. It still remains, however, to be explained, why this salt, which is not more stimulating than many others, acts with so much better effect, and why its action its continued during several years, whilst that of others is exhausted in so much less time, why this salt never dries plants, whilst the others, if employed in excess, burn them up and destroy them. These are problems which remain to be solved, and of

*This savors a little of the manner of English travellers in writing about us.

which the solution cannot be found, in the stimulating properties of the plaster.

"Hitherto it has been sufficient to state the good effects of plaster, in order that agriculture might be enriched by so important a discovery. The fact alone is sufficient for the farmer, and it is not the only one in which the theory can add nothing to the practice. I shall; however, give here a few of my ideas upon the action of plaster; and I publish them with the more confidence, because they appear to me to be deduced from well established analogies.

"It is proved that those salts which have a base of lime or alkali, are the most abundant in plants. Analysis also shows, that the different salts do not exist in the same proportions, either in plants of different kinds, or in the different parts of the same plant.

"On the other hand, observation shows us every day, that these substances, to be beneficial to plants, must be presented to them in proper proportions; for if too great a quantity of salts easily soluble in water be mixed with the soil, the plants will wither and die; though they will languish if totally deprived of the salts. A little marine salt, mixed with dung and spread upon the soil, excites the organs of plants and promotes vegetation; but, too much will produce a pernicious effect upon them.

"If we now consider that salts can act upon plants, only in proportion to their solubility in water, through which medium they are conveyed, we can conceive, that those which are least soluble will be productive of the greatest advantage.

"Water can hold in solution at any one time, but a small portion of these saline substances: and as they will always be conveyed into plants in the same proportions, their effect will be equal and constant, and will be continued till the soil be exhausted of the salts. The length of this period will be according to the quantity of them which is contained in the soil, and to the plants not being rendered liable to receiving more of them than it needs.

"The solubility of plaster in water appears to be precisely of the degree most beneficial: 300 parts of water will dissolve only one of plaster. Its action is therefore constant and uniform, without being hurtful. The organs of plants are excited by it, without being irritated and corroded, as they are, by those salts which being more soluble in water, are carried more abundantly into plants, producing upon them the most injurious effects.

"The greater part of those salts which are found in plants, serve no purpose of nourishment; they are generally useful only as stimulating the organs, and aiding digestion. Animals, as they enjoy the power of locomotion, can easily procure for themselves these stimulants, and whatever is needful for the exercise of their offices, and they take only such quantities, and in such proportions, as are suitable for them. But plants have no other medium than air and water, through which to receive their supplies; and this last transmits to them indiscriminately, all which it can dissolve from the soil: whence it follows, that the best saline manures are those that can be only gradually dissolved.

"This principle is applicable to all manures of whatever nature. There is, however, this difference in the effects of manures purely nutritive, and of the stimulating or saline manures: if the first be too abundant, the plant absorbs more nourishment than it can readily digest, and becomes affected by a kind of obesity; the texture of its organs is rendered soft, loose and spongy, and unable to give to their products the due degree of consistency; whilst, on the contrary, if the stimulating manures be supplied too profusely, and especially if they be of kinds very soluble in water, the organs of the plants are dried and parched by the excess which they receive.

"Those animal substances that are the most slowly decomposed, and which by their decomposition, always give rise to soluble products, are the best of all manures: of this, bones, horns, and wool, afford a sufficient proof. These substances possess the advantage of affording to plants their suitable aliments, almost always combined with a stimulant, such as ammonia, of which the too irritating action is moderated by its union with carbonic acid, or with animal matter.

"The ashes of the turf and of pit-coal produce wonderful effects upon grass lands. The first of these, often contains gypsum, but frequently only silica, alumina, and the oxide of iron. From ashes of pit-coal I have obtained by analysis, sulphuret of lime.

"The ashes produced by the combustion of wood in our common domestic fires, give rise to some very remarkable results. Without being leached, these ashes are much too active; but after having been deprived, by the action of water, of nearly all their salts, and employed in this state, under the name of *buck ashes*, they still produce great effect.

"The action of the buck ashes is most powerful upon moist lands and meadows, in which they not only facilitate the growth of useful plants, but if employed constantly for several years, they will free the soil from weeds. By the use of them, land constantly drenched with water, may be freed from rushes, and prepared for yielding clover and other plants of good kinds. Wood ashes possess the double property of amending a wet and clayey soil, by dividing and drying it, and of promoting vegetation by the salts they contain."

The foregoing extract is taken from page 73, *et seq.* of the first American, translated from the second French edition of "Chemistry applied to Agriculture by John Antony Chaptal," published in Boston by Hilliard, Gray, & Co. 1835. It seems to settle the question of the utility of burnt or baked plaster, upon good authority. Chaptal was a great chemist and a distinguished farmer. To this section of country it is most important, that we should be able to get plaster at a price much reduced from its present standard. Nearly twenty years ago, I bought plaster at five dollars per barrel, which, allowing seven barrels to the ton, is thirty-five dollars per ton. Since that time the price has been regularly diminishing. Last spring it sold at sixteen to fourteen dollars. Our agriculturists, however, cannot afford to purchase largely at these prices—especially, as there is a strange capriciousness in the action of even the best plaster on our lands. If baked plaster will answer, there will be no necessity for it to change owners so often between the importer and the land holder, and of course, it will cost less. We have also reason to hope that the cost of carriage will be much reduced by the contemplated improvement in the means of transportation.

The importance of the subject has led me, though much pressed for time, to prepare for you a most hurried transcript of Chaptal's views, which you can publish as they are, or abbreviate to suit you. Your own opinion on some of his points would doubtless be acceptable to your readers. I deem it proper, that some facts, which have been observed in this neighborhood, should be furnished you, in relation to the transmission of salts into plants.

On my tract of land there are several spots, originally deer-licks, which for a long time remained entirely barren of all vegetation, and in certain states of weather, would be frosted over with beautiful crystals of marine salt. These, by the washings from the grounds above, and other causes, have within a few years been covered with some soil and a little vegetable matter. During wet spells, in warm weather, grass will grow on these spots with considerable luxuriance; but as soon as the weather becomes dry, crystalization of the saline matter exuding from the surface of the grass, leaves may be observed—the plants are all white with salt, and in a few days, not a vestige of verdure can be seen. Some of the grass-roots, however, survive, and grow again on the return of moist weather. Possibly some of the marine vegetables which yield soda might grow well on these spots. Trees also are liable to receive into their vessels an excess of saline matter. Not long since, a very wet sack of salt was laid at the root of a young Lombardy poplar in Farmville. A moist spell ensuing, the tree flourished for a while, and a beautiful crystallization of salt was observed on the under side of every leaf. On the return of dry weather, every leaf dried up and fell, and the tree was thought to be killed. It afterwards revived, and is still alive.

I have recently learned that much of the secondary stripe of land, on which I reside, was, at the settlement of this region, destitute of trees. I have seen the original patent for my tract, in which, it is stated to lie on the *barren-lick* branch; and my father, who is still alive, can remember when much of the tract was bare of trees. I state this fact, because I know you wish information on such matters.*

W. S. MORTON.

"CHARITY THINKETH NO EVIL."

To the Editor of the Farmers' Register.

After an absence of some weeks from home, I returned only a few days ago—when, for the first time, I saw your September No. You may imagine my surprise, when looking over this valuable journal, I turned to a paper written by myself, to which you have given the horrid caption of "A deed without a name," and to which you have appended, by way of comment, "that the author's fact you hold as nought—himself, unworthy of credit," or words to that effect; and further, that the communication would not have been noticed, but for its supposed personal bearing.

Mr. Editor, (if the author be at all worthy of credit,) nothing was further from his intention than to inflict on you the slightest injury, by thought, word, or deed. He believes you like nothing fulsome; but it is an act of sheer justice to say, that he regards you as a public, a national benefactor. He believes, that, like Moses of old, you are leading through a dreary wilderness to a land of promise—understand me, Mr. Editor, I intend no impiety—I mean that if we follow your advice, and example, this land of sterilty may be converted into one overflowing with milk and honey—a land which the Israelites might have sought, as one of God's best gifts, when fleeing from the wrath of Pharoah.

The article on which you have fixed the seal of your bitter denunciation, was written in a moment of exultation, after having witnessed the wonderful effects of marl, on a soil exhausted by the severest usage. I am not very certain that it was not prompted by a feeling of gratitude to the giver of all good things, for the wonderful provision of his bounty, in placing within the reach of us, his poor creatures, the means of an ample return for the sweat of our brows.

Perhaps, sir, I may be an enthusiast on this subject; but I am possessed with the belief, that by the simple application of marl, the tide-water district has within itself the means of an entire restoration of the original fertility of its soil; and nay more, that by its judicious application, the land itself will become more productive, and the air we breathe, more salubrious. Why should it not be so? The best European and American writers think lime a necessary ingredient of every fertile soil: you yourself seem to be satisfied that calcareous matter only is wanting to render our tide-water lands productive—this of course, with a due quantity of vegetable or animal manure—for without a reasonable return of these, no man in his senses can expect his *mother earth* to afford him abundant harvests. Marl will supply this valuable desideratum. So much for fertilizing the earth. Sir John Sinclair, (whose name is a host,) states, that however productive soils may be rendered, (I quote from memory,) yet if it be from the effects of lime, no injury to health ensues, as the decomposition of the vegetable matter is corrected by its presence: of course, the air it gives out in its putrescent state is not inimical to human liife. Now, sir, are these facts? If so, here is my conclusion—that marl not only fertilizes the earth, but purifies the air we breathe; and looking through the operations of nature up to nature's God, I devoutly thank him for his manifold gifts—not the least of which, is his unspeakable goodness, in this wise provision of his bounty, in placing within the power of us poor mortals, by a judicious application of our labor, the means of health and abundance.

I am afraid to say more on the subject of my experiments, lest you should again nail them to the counter as base coin; and hereafter I must content myself with pursuing the even tenor of my way, as an unobtrusive, but *bona fide*

MARLER.

[We beg our correspondent to dismiss from his mind

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*The readers of the first No. of this journal will remember Dr. Morton's description there given of the stripe of land which is here referred to, and the reasons for believing it to have derived its peculiar character from containing calcareous matter. ED.

all suspicion of having excited any unkind or unpleasant feeling. It is true that his former communication was considered as more jocular than serious—but his joke was deemed a *very good* joke—and not the less amusing, or the less acceptable, because of its supposed bearing on the editor's "hobby." But if we mistook the purport of his piece, we hope that the mistake will not cause him to abandon his pen, as he intimates—but rather that it will induce him to lay aside his *incognito* character, and as a "*bona fide*" and correspondent, under his proper name, as well as "*bona fide* marler," will prevent all future mistakes of his intentions, and *command* respect and credence for his statements.]

From the Somerset Journal.

A WORD TO FARMERS.

It is not perhaps generally known, that the potato tops sustain through the winter a worm very destructive to grain. Mr. Chapman, of Madison, in this country, showed me a few days since a piece of wheat, on ground where potatoes grew last season, on a part of which the tops were collected together and burnt last fall. Where they were suffered to remain, at least three fourths of the wheat has been destroyed by worms; and what they have not destroyed is small and sickly—while the wheat where the tops were removed shows no mark of their ravages.

For the Farmers' Register.

OSAGE ORANGE—(*Maclura aurantiaca.*)

The following extract respecting the Maclura, is from Loudon's Encyclopedia of Plants: "A spreading deciduous tree, about twenty or thirty feet high, with a yellow axillary berry, the size of an orange—nearly as succulent, and said to be as agreeable, when fully ripe."

The fruit is beautiful, and tempting to the eye, but disagreeable to the taste. It is, properly speaking, a compound berry, or berry-like aggregate—growing on very short peduncles, and attaining at maturity, a considerable size. It is globular in its form, with a warty surface; of a pale yellow cast, and rather fragrant than otherwise. A tree growing in my garden yielded this year about one hundred and fifty—many of them weighing eighteen or nineteen ounces.

The berries are formed at the axils of the leaves, and when they are as large as sycamore buttons, which, in that state, they exceedingly resemble, the pistillate organs become fully developed. These organs are filiform; like the silk of Indian corn, very numerous, and about an inch in length. The seed, however, are frequently abortive, owing probably, to the partial fructification by the pollen from the staminate plant.

The branches of the tree are armed with a number of very rigid spines, which have induced many persons to suppose it may be profitably used for hedges. It flourishes in almost any tolerably fertile soil—is extremely hardy, and with sufficient clipping, it is highly probable it may become valuable for that purpose.

It has also been suggested, that the Maclura might be usefully employed in the arts. The whole tree, including the fruit, abounds in a thick milky fluid, which might doubtless be converted into caoutchouc. It readily assumes a viscid and elastic consistence when exposed to the air. This gum, however, is obtained in such immense quantities from South America, and at so cheap a rate, that it may not be profitable to cultivate any of our plants for the purpose of obtaining it.

T. S. P.

THE GREAT POPLAR OF DINWIDDIE.

To the Editor of the Farmers' Register.

Amelia, Nov. 20, 1835.

Your complaint in the last number of the Register, of the want of communications of matters of fact for your work, will excuse my sending you for insertion, an account of a tree growing near the borders of this county, (in Dinwiddie, on the lands of John Hamblin, Esq.) It is a poplar (*Tulipefera Virginiana,*) perfectly sound, straight, and flourishing; measuring thirty-four feet six inches round the body at six feet from the ground, and forty-three feet eight inches at three feet from the ground—its height to the first limb ninety feet, without a limb, knot, or any irregularity whatever, up to this first limb—and is indeed the most beautiful and remarkable tree I ever saw, or read of in this country. I understand the late Bishop Madison once visited this tree, at which time its dimeter at three feet from the ground was thirteen feet. If so, its growth within the last thirty years has been considerable. The owner has cleared the land around it, and it stands in solitary grandeur. It is remarkable that no one approaches it without disappointment. Until you are very near to it, you are not at all struck with its enormous size and height. Nor indeed, when at it, can you believe it is so high to the first limb, until you make the effort to throw to it, which very few men can do.

In the Memoirs of the Philadelphia Agricultural Society, there are accounts of several remarkable trees in this country—but I believe none of them, taking size, height, soundness and beauty together, equal this.

A SUBSCRIBER.

From the New England Farmer.

LARGE AND SUCCESSIVE CROPS OF INDIAN CORN, RYE AND HAY.

The following system of cultivation, by which three valuable crops, of Indian corn, and rye, and clover, may be obtained in two years, I would recommend as highly deserving of trial by farmers generally.

While once on an excursion, on the river Merrimack, and at Haverhill, I was politely shown, by Mr. David Howe, his spacious and well stored barns, and large stacks of hay, the produce of his extensive and fertile fields, lying on that river, which were cultivated by this same, or a very similar mode.

In the spring of the year early, or what would be preferable, in the course of the preceding autumn, or winter, the manure, in a suitable quantity, is applied equally over the whole surface of the field, and intimately incorporated with the soil by repeated but not deep ploughings and harrowings. At the suitable time for planting, the whole field is again ploughed and furrowed, in rows four feet asunder, and again cross-furrowed in rows at the same distance, and the corn is immediately dropped in the hollows, which are formed by the intersection of the cross-furrows, and covered to the usual depth.

At weeding time, the corn is earthed up a little, and nearly to a level with the surrounding earth. It is twice hoed afterwards at the suitable periods, but never hilled. At the last hoeing the ground is rendered perfectly clean and level in every part. Winter rye, and clover, and other grass seeds, are now sown over the whole field in suitable quantities, and covered by drawing a bush harrow between.

In autumn a large crop of corn may be expected, and in winter when the ground is frozen, with a well sharpened hoe, the stubs of corn are cut close to the surface. Early in the next summer, the rye is reaped, yielding a good crop, and at midsummer, when the heads of the clover are half turned to a brown color, the whole fields, clover and rye stubble intermixed, are mown; the whole together constituting a large crop. The rye stubble absorbs the juices and the flavor of the clover, which it retains, thus becoming highly palatable and nutritious, and forming, when all are well made, a large amount of food, of a quality superior for horses, and other domestic animals.

Thus are three crops produced in two years, and on the same ground, where, ordinarily, but two crops are yielded, and all with a diminished amount of labor and expense.

The clover being a biennial plant, a large crop of hay is produced in the third year from the other superior kinds of grass which were sown.

It is admitted that where large crops of Indian corn are desired, *hilling up* should never be practised, but the ground in all the latter stages should be preserved perfectly level, neither should the ground be ploughed after the first hoeing, but only harrowed lightly, or slightly stirred with the *cultivator*, an admirable instrument, intermediate between the harrow and plough; that the roots which will be found extending at a little distance beneath the surface, in every direction, may be suffered to remain, proceeding unmolested.

The rye, and the clover, and other grass, serve as a mutual protection to each other, during the severe and open winters.

Very respectfully, your friend,

WILLIAM KENRICK.

Nonantum Hill, Newton, Nov. 26th, 1835.

THE FARMING AND GENERAL ECONOMY OF THE SHAKERS.

From the New York Farmer.

[We feel the more gratification in republishing the following notice of the admirable habits of a remarkable and singular community, because the views agree precisely with our own, founded upon a more hasty visit and inspection, a few years ago. The writer who here speaks so much in the spirit of toleration and benevolence of the Shakers, is the Rev. Henry Colman, of Massachusetts, a distinguished agriculturist, from whose communications to other journals, extracts have frequently been placed before our readers.

In their government and domestic economy, the Shakers furnish an admirable study for the scientific agriculturist, and a striking illustration of some of the important doctrines of the political economist. They exhibit the most distinguished success in farming, and of the power of accumulating capital, founded on scanty means, and carried on in spite of various unfavorable and adverse circumstances. The only secret of their success is, that *nothing is permitted to be wasted,* of time, labor, or capital—and they prove by the *results,* that where every little matter tends to the same good and general end, that profit, comfort, and wealth will surely be obtained. The Shakers are the best farmers and economists of our country—and their separation of the sexes serves to cut off entirely from themselves, and also in a great degree, from the surrounding population, the evils of pauperism. However foolish and unnatural their laws and customs may be deemed, they work well, in several ways, for the good of the country at large. Considering the society merely in its relation to national economy, it would be a blessing to our country if Shaker settlements could be extended to every county. There would be no danger of the members becoming too numerous—and their singularities might well be excused, and submitted to, by society in general, in consideration of their being truly the best working bees in this world of drones.]

The nearest approach to what may properly be denominated pattern farming, as far as my observation extends, is to be found among the Shakers. With two of these establishments I have been somewhat familiar; one at Canterbury, N. H., and one at Hancock, in Massachusetts. To a mind pleased with the most exemplary industry, sobriety, good order, neatness, and exactness, nothing can be more gratifying. Of their religion I shall say nothing, further than to remark that there must be some good in a religion from which so many good fruits arise. Every man's religion, except so far as he may injure his neighbor's peace, or disturb the public tranquility, is, in my humble opinion, an affair entirely and exclusively his own; and on the same grounds, on which I claim freedom for myself, I am entirely satisfied, that these upright and peaceable communities should enjoy their liberty. But their industry, economy, neatness, and good management are no where exceeded; and above all praise.

The farm, occupied by the community at Canterbury, comprehends two thousand acres in one body, and five hundred in out lands. It is situated on a high and broad hill; and the buildings, which are remarkably neat and commodious, are visible at a considerable distance. The public road runs through the centre of the farm; the lots are well divided by good and substantial fences; the gates are neatly painted, and the roads kept in the finest condition. Their first object appears to be to raise for themselves a comfortable, I had almost said, a luxurious subsistence; and beyond that the surplus is sold either in a raw or manufactured form. Their grass fields are perfectly clean; not a stone, not a stump is left standing, not a weed is suffered to grow by the wall side. The land here is of an inferior character by nature; cold, gravelly, and clayey, and hard to work; but cultivation perseveringly and judiciously applied, has rendered it comparatively rich and productive. I was curious to come at the amount of crops by some better authority than by conjecture; and one of the principal trustees was kind enough to communicate some facts, which I deem instructive.

From a piece of grass land of twelve acres near the principal dwellings, they usually, and upon an average, obtain twenty-eight tons of hay per year; and in one year they obtained, accurately ascertained, thirty-eight tons of good English hay. This land has been forty years uninterruptedly in grass; it is manured regularly and copiously every second year, and a spike roller is used upon it with great advantage in the spring. Their crop of oats this year, upon ten acres, averaged sixty bushels to the acre; and they spoke with approbation of the Tartarian, or as some call it, the one-sided or horse-mane oat. They have been many years in the use of the revolving horse rake, which they make with admirable neatness, pointing all the teeth with iron; and for the sake of cleaning the field after the horse rake, they use a hand rake, the head of which is about five feet long, and which is made fast to the handle by two long iron rods. Where the grass is thin this rake is easily managed by one man, and a great deal of work is done by it.

Their pig-stye is well worth a visit for the neatness, yes, the neatness of a pig-stye! and the admirable and happy condition of its tenants. Twenty or thirty swine, in clean swept styes, whose average weight at killing time will be between four and five hundred pounds, is a sight which Parson Trulliber, in Joseph Andrews, would have looked upon with ecstacy. The whole care of the swine in one building devolves upon one man, whose feeding tubs, and pails, and dippers, and cloths, and brooms, were as exactly arranged as in any lady's kitchen. The troughs are projected in front of the styes; and are closed by a swinging cover. When they are to be fed, this cover is bolted down to the inner side of the trough, so that it may be cleaned, and the food put in, without any interference from the hungry expectants, who are not suffered to come to the table until every thing is ready; when the swinging cover is raised and bolted to the outer edge of the trough, to which they then have ready access. I hope I have made this arrangement intelligible, as it is decidedly the most convenient I have ever seen. Intimacy commonly produces attachment; and I was curious to know of the respectable old man, who took care, if he did not become fond of them, and feel some reluctance to having them killed. Nay! nay! says he, from which I was compelled to infer that the poor hog is actually beyond the pale of human sympathies. Why is this? have they no virtues? if they have, they remain to be developed; have they no moral sense? it seems to me, nothing which approaches to it; in this respect they appear to stand almost at the lowest round of the ladder in the animal creation; and last of all, whether they have virtues or moral sentiment or not, they certainly, to use the current Yankee phrase, "they certainly have no manners." This seems to exclude them from all courtesy, and to shut up even the compassions of a "friend" towards them. I have only to add that the food is always cooked, and that the Shakers consider a portion of rye mixed with corn as very much improving their food. Their experience leads them to the conclusion that they would prefer to buy rye at a quarter of a dollar more a bushel than corn, to mix with corn in equal parts, than to give their swine Indian meal alone.

Their dairy is extensive, and in its interior arrangement is most admirable for its order and neatness. Their butter was very superior, and their cheese, I am told by those who can judge of it, equally to be commended. A little contrivance for turning their cheeses, which I cannot, I fear, describe so as to render intelligible, but by which the board on which the cheese is placed is suddenly inverted by a spring, was ingenious, and made it easy to manage the largest cheeses. I visited at milking, one of their yards of forty or fifty cows, whose appearance and product were good. In this part of the country, the season has been universally unfavorable to dairy products, A few years since, they obtained an improved Durham short-horn bull, reputed of pure blood, and a descendant of Admiral; and a large proportion of their cows are half-blood of his stock; but the cross has not been attended with any particular advantage in respect to milk.

They have various contrivances for facilitating labor; among others, by means of a windlass, a swinging beam, and some large iron hooks, they are able to take a load of hay from the cart at one lift, and deposite it in the mow. Their situation afforded no natural water power; but by the erection of a dam between two hills, and turning several springs, they have formed an artificial reservoir, or head of water, which affords a supply for all their purposes; and this water is used six times before it reaches the foot of the hill. They have on the stream a thrashing mill, saw mill, corn mill, bark mill, and other works. Their thrashing machine is of their own invention, and has evidently furnished the model of many of the machines for which patents have been taken out.

They have a very fine vegetable garden, and raise a great amount of seeds for sale, and likewise a botanical and medicinal garden; and dry and press great quantities of culinary and medicinal herbs, which are disposed of in different parts of the country to advantage. These establishments are also managed with exemplary care. Their flock of sheep is comparatively small, chiefly of the pure and mixed Merino. The yield of wool is over four pounds, but it is not washed upon the sheep's back, as they deem it injurious to the sheep. They have a small flock of Dishley or Bakewell sheep, which they are inclined to dispose of; as they consider them as less hardy and not so profitable for their purposes as the Merino. I give these opinions of theirs, which perhaps are mere prejudices, without comment.

The Shakers' village at Hancock and Pittsfield, Mass. is a smaller village than that at Canterbury; and their operations are chiefly confined to providing for the subsistence of the family, to some few manufactures, and to the raising of garden seeds. In point of soil, the location is not very eligible; but there are throughout the whole establishment the same order and neatness, the same admirable and ingenious use of all the means and powers for facilitating labor that come within their reach; and the same general indications of industry and good management, which appear in the former case. The great object of agricultural curiosity at Hancock, is their magnificent stone barn, two stories in height and ninety-six feet in diameter. The great mow is in the centre, and is said to be capable of containing between three and four hundred tons of hay. The floor,or driveway, is on the outside of the circle, and the team goes round and comes out at the same door at which it enters. Several teams can stand on the floor and be unloaded at the same time. In the centre of this mow a large post or mast is erected, reaching from the ground to the roof. At the apex of the roof is a small cupola, like those usual on distilleries. Around this post, slats or strips of plank are placed at a small distance from it, to prevent the hay from coming in immediate contact, and the hay at the bottom being raised by an open frame from the ground, a perfect ventilation is formed, and the steam from the new hay is in this way effectually carried off.

Upon the whole, it is hardly possible for an observing man to visit these establishments without the highest gratification. They have very great advantages in the amount of labor, which they are able to apply to any purpose, which they design to accomplish; and this labor is a most valuable capital, though they are not wanting in pecuniary resources, their honest gains being carefully secured and managed. But they are at the same time entitled to the highest praise for their good conduct and good management. Their farms are literally pattern farms; models of careful, frugal, judicious, exact, neat, profitable husbandry. They are an exemplary and useful community; just in their dealings; peaceful and orderly in their deportment; wishing well to all men. They contribute their full share in bearing the public charges; and at the same time they throw no burdens whatever upon the public purse, and ask no favors of the public beyond simple protection. That there are some hypocrites or knaves among them, is very probable; for what community is without its corrupt mixture? but it is highly to their honor that no general charge of this nature has ever been substantiated; and that the general character of the society for honor, purity, truth, and justice, strong as has been the tide of prejudice and superstition against which they have had to contend, has remained unimpeachable. The deciples of Malthus, and the benevolent political economists of the present day, could no where expect to see in more perfect operation the great moral preventive check. To be sure, on the principles of the Shakers, the world must soon become a solitude; but there are counteracting influences in human nature amply sufficient to save us from all apprehensions of any such disastrous results. The population of the world will go on, and if, with its increase, happiness and improvement will be extended, so also must poverty, misery, and vice prevail. This peaceful community will present a refuge to many, wearied and disheartened with the cares and perplexities of life; will afford a favorable opportunity to other anxious and sensitive minds to cultivate, perhaps under very mistaken, though honest views, and extraordinary virtue, and a purity more than earthly; will open its welcome doors to many a friendless and houseless being, many a desolate and heart broken widow: and throw its protecting wing over many a fatherless child, and train him to habits of industry, sobriety, self-government, and moral purity. In all their good deeds and intentions, may the blessing of Heaven rest upon them. Whether they can sustain themselves amidst the expanding and brightening light, and the continual and extraordinary changes of society, time only can disclose. Their extinction, to say the least, would be the loss of one of the best examples of general sobriety, industry, harmony, good order, and equity, which can be found in the world. But I fear I may have travelled too far out of the record. I had designed to speak of them only as an agricultural community; and as such their management is in every respect an admirable pattern.

H. C.

Meadowbanks, Oct. 15, 1835.

EFFECTS OF BLACKSMITHS' CINDERS AS MANURE.

To the Editor of the Farmers' Register.

In the course of almost every farmer's agricultural experience, things are brought before his mind by circumstances, which, if properly investigated, might be useful to the public. Such matters generally die with the discoverer, and some of them, perhaps, are re-discovered an hundred times, before they become fully the property of the public. Agricultural societies and journals often save from oblivion, valuable facts and opinions which might otherwise be lost. If each one who thinks he has observed any thing worthy of preservation, would lay it before some society, or the editor of some well conducted journal, we might occasionally obtain information capable of extensive application,in matters,thought by the original observer to be contracted in their nature. This formal introduction is not designed by the writer, as a prelude to the annunciation of any important discovery of his own—it is rather intended to elicit from others information, which diffidence may have led them to withhold, and as an apology for troubling you, sir, with a matter whose importance the writer does not feel capable of deciding.

Some twelve or fifteen years ago—the exact period is forgotten—I spread upon a small piece of land, perhaps about two acres, a large pile of cinders, which had long been accumulating, at the end of an old smith's shop. At the time this was done, the chief benefit was expected from some remains of sulphureous matters which might be in the material, as much pit coal had been burned in the shop. I also hoped, that simply blackening the soil would improve its products by enabling it to absorb more heat. The next crop was fine, and it has continued to produce wonderfully ever since. For the last ten years, though very slightly cultivated, it has yielded a good crop of corn, except one year, when it brought a fine crop of oats. I do not recollect that I ever put on it any manure, besides the cinders, and I hardly suppose that the tenants, who have occupied it for the last nine years, have burdened it with manure. Indeed I do not know, that they have manured it at all. This little lot is considerably exhausted by scourging treatment; but I do not know, in this vicinity, a piece of high land of the same size, to which, if moderately manured, I would sooner trust, for a fine crop of any kind.

I have felt much at a loss to account for the cause of this increase of fertility from the use of blacksmith's cinders. Since learning a little more, however, of the chemistry of agriculture, from your writings, and from other sources, I begin to suspect that I have learned the secret. Blacksmiths, while heating their iron and steel, use sand largely, by throwing it on the fire and dipping the metal to be operated on in beds of it, to prevent oxydation. There is some potash also, probably, formed from the ashes of the coal exposed to extreme heat. Thus, we have the materials for the formation of the silicate of iron and potash, which seems to be the acting manure, in the famous Jersey marl. Of course, if this notion be correct, every blacksmith, while forming tools wherewith to work the land, is unconsciously preparing a most excellent material for its improvement.

It is true, that no great surface of land could be manured by shop cinders, if those from every shop in the state were carefully used. But in agriculture, small matters are not to be despised. Enriching a few acres in every neighborhood, throughout the country, by means heretofore neglected, is certainly a matter worthy of attention. But besides the cinders from smith shops, a vast amount of a similar material may be found, in the scoriæ from the various kinds of iron-works in the country. These, probably, would be more valuable than ordinary shop cinders, inasmuch as a great deal of lime is used as a flux in iron-works. I have an intelligent and public-spirited friend, largely engaged in iron-works, whose attention, I can almost pledge, to testing the value of such scoriæ as manure, should you think this matter worthy of notice in the Register. It should, perhaps, be noticed, that as the materials alluded to above, belong to the class of stimulating manures, they will, of course, need some aid from those which are nutritious.

W. S. MORTON.

ON PLANTING THE SWEET POTATO.

To the Editor of the Farmers' Register.

The mode I am about to relate, was told to me some time since, by a gentleman of this neighborhood, and may be the common one pursued by many of your readers and subscribers; but it is one very little practiced, or known, so far as I am informed, in this part of the country—and therefore may be of some benefit, to some one of your numerous readers.

Early in the spring, procure your seed potatoes —then prepare a bed from four to six feet in width, in any well pulverized earth, (say your garden,) by raising the earth about a foot above the level of the surface of the earth. On that put a layer of your potatoes, two or three inches thick—then a layer of fine moist earth, the same thickness, and so on with a layer of potatoes and layer of earth, until you have put as many down as you want to plant. The bed must be kept moist by artificial watering, in the absence of rain. Examine the roots occasionally, so as to ascertain when they have arrived at the right stage for planting, which is, when the sprouts are about an inch long. Then prepare your ground well, when it is moist, where you intend planting: then take out of the bed and plant immediately. Be careful not to break the sprouts.

By this very easy and simple mode of preparing your seed, you will have potatoes from three to four weeks earlier than you would have if planted in the usual old way—that is, in the hills when they are first taken up in the spring.

M.

From the New York Daily Advertiser.

NEW ENGLAND TOBACCO.

It is surprising to see the great quantity of tobacco that is constantly arriving from Connecticut River. The Bunker Hill brought down last trip, fully equal to fifty hogsheads. We learn that it is not only cultivated extensively along the banks of the Connecticut River, but that it commands a much higher price in that market than any other American tobacco.

OF THE EFFECT OF GYPSUM ON TOBACCO, AS TESTED BY A SERIES OF EXPERIMENTS

Read before the Agricultural Society of Charlotte, and ordered to be published in the Farmers' Register.

At the last meeting of the Society, I communicated the following facts in relation to the effects produced by the application of plaster on my crop of tobacco, then growing. Owing to the difficulty of obtaining plaster, its application was delayed until some time between the 10th and 20th of July, when the larger number of the plants had been topped. It was applied, by dropping from the fingers on the top of the stalk, or in the bud when not topped, so as to be distributed along down the stalk and upon the stems of the leaves where they join the stalk, to the amount of about a half an egg-shell to each plant, leaving several rows through different parts of the lot, unplastered. On the evening and night after we finished this process, there was a fine fall of rain, after which I did not again see the lot until the eighth day from the time the plaster was applied, when to my astonishment, the whole lot, which had before looked faded and sickly, had assumed a fine healthy and vigorous growth, with the exception of the unplastered rows, which still retained the yellow and unhealthy appearance. The change produced by the plaster was so obvious and striking that I carried several persons to see it, who readily pointed out the unplastered rows. Among others, some of my fair friends, who, (however acute they may be in detecting the difference of quality of silks and satins, would not be supposed to possess any extraordinary scrutiny in regard to the quality of tobacco) as readily pointed them out. The difference, though obvious in the size of the tobacco, was more so in the color, and perceptible to the feel with the fingers, the leaves of the plastered tobacco evidently having more "body." The difference has existed to the present time, (the 20th of August,) and can be seen as far as the spaces between the rows can be distinctly marked by the eye, but is not altogether as striking as for a week or two after it was first noticed—and although evident improvement has been produced throughout my crop by the use of plaster, yet, (owing probably to the fact, that the remainder of it was on land cultivated in tobacco last year, and of course, clear of litter, and that the plaster was applied after the rain,) the effect is not as obvious in any other part of the crop as the lot referred to. Part of the lot on which my experiments were tried, has been cleared six years—cultivated the first three in tobacco—the fourth in wheat, seeded in clover—rested the fifth (except a small part mowed for hay) and ploughed last fall, with a heavy coat of clover and broom-straw mixed. The other part has been cleared much longer; cultivated repeatedly in tobacco, seeded in wheat and herdsgrass, and had remained five or six years in turf—though for several years past, covered with a light coat of litter.

On communicating the above facts to the society, I was requested to test the effect of the plaster by weighing the plants, both in the green and cured state, and report the results. Accordingly, I submit the following, as ascertained by the most careful personal investigation I could make.

The first experiment, was made on two rows, side by side, running nearly east and west on a gentle declivity of a southern exposure, with a soil of gray sandy loam, based on yellow clay—containing each forty-two plants. A man preceded one with a knife, passing on between the plastered and unplastered rows, with instructions to cut every plant thoroughly ripe. In the plastered row he cut sixteen plants—in the unplastered ten: showing a gain in favor of the plastered row a difference of four plants. As soon as the plants had completely "fallen," (or withered,) I weighed the ten cut from the plastered row, which weighed 20 lbs. I then weighed ten from the unplastered row, which weighed 19 lbs.—showing a gain in favor of the plastered row of only 1 lb.

The second experiment was tried on two rows extending across a hollow, or drain, through the clovered part of the lot, containing two distinct soils, one which is the theatre of this experiment precisely similar to that on which the first was tried; the other beyond the hollow, of a chocolate color, based on fine red clay. The plants were cut and weighed, as in the first experiment, with a view to make the test as accurate as possible, and resulted thus: the ten unplastered plants weighed $15\frac{1}{2}$ lbs.—the plastered, $23\frac{1}{4}$ lbs.—making a difference in favor of the plastered plants of $7\frac{3}{4}$ lbs.

The third experiment was made in the same rows on the other side of the hollow, in the chocolate colored soil, with the red clay base, with the same care as the others, and resulted as follows: The ten unplastered plants weighed $15\frac{1}{2}$ lbs.—the ten plastered plants $20\frac{1}{4}$ lbs.—leaving a difference in favor of the plastered plants of $4\frac{3}{4}$ lbs.

I then hung these several parcels on separate sticks, in the usual manner, (except that they were numbered, to avoid mistakes,) and placed them side by side in the centre of the barn, on the first firing tier, (so that they might be equally cured,) and after curing them in the usual way, stripped and tied them up in bundles as for pressing. They were then separately weighed, and the results follow:

	lbs.	oz.		lbs.	oz.		lbs.	oz.
The 1st experiment—unplastered,	2	13	Plastered,	2	$15\frac{1}{4}$	Gain,		$2\frac{1}{4}$
2d do do	2	9	do	3	10	do	1	1
3d do do	2	5	do	3	$4\frac{3}{4}$	do		$15\frac{3}{4}$
	7	11		9	14			
Total gain in the 30 plants,							2	3

Estimated gain in a crop of 10,000 lbs., lbs. 2215 oz. 3

That sold at $8 per hundred will be $800. Gain in the sale,	$177	20
Off for 4 barrels plaster at $3 per barrel,	12	
Nett gain,	$165	20

ANDERSON C. MORTON.

EXPLANATION AND CORRECTION.

To the Editor of the Farmers' Register.

Orange, 18th Nov., 1835.

In my communication published in the 7th No. of the Farmers' Register, at page 444, on the improvement of worn land by clover and plaster, I observe in a note a query by the editor, viz: "Is this great improvement of the poorest forty acres known from experience?" In answer to this query, I must remark, that I did not intend to say this would be the result if there was a very great difference in the quality of the land, but I can safely say that I have experienced this to be case when the difference was not very great, and all of the land capable of producing a good crop of clover, with the use of plaster—and provided the greatest proportion of the clover was suffered to remain on the land and rot, and the last crop of clover ploughed under in the fall or winter before the land is put in corn. You will perceive that the forty acres will have had, in three years, only one grain crop, and two ameliorating or clover crops; whereas, the eighty acres will have had two grain crops, and only one ameliorating crop.

CATLETT CONWAY.

P. S. There is a mistake in the table attached to the piece above alluded to, viz:—the rotation of the second field commences with "80 acres in wheat after clover, 40 in wheat after clover." It should be "80 acres in wheat after corn, and 40 acres in wheat after clover"—else it would appear as if the whole field of 120 acres was clover fallow.

C. C.

EXPERIMENTS IN GATHERING CORN FODDER, AND THE DIFFERENT EFFECTS ON THE GRAIN. FACTS AND OBSERVATIONS IN REGARD TO CALCAREOUS AND OTHER MANURES.

To the Editor of the Farmers' Register.

Your call for facts in the November No. of the Register, has induced me to submit the following to the inspection of the public, which was originally intended to be the commencement of a series of experiments to satisfy my own mind, whether or not injury resulted to the grain of Indian corn from depriving it of its tops, as well as stripping it of the blades below the ear.

On the 13th of September, 1834, I selected five adjacent rows of corn, of similar appearance, planted on the same day, in rich bottom land, and cultivated alike throughout the summer. In each of these rows I selected 50 hills, passing by such as had more than one ear, and rejecting all whose ears, when examined attentively, did not seem to be of the same kind. It stood one stalk in a hill; three feet by five apart, having inadvertently been left thinner than the corn in the rest of the field. This corn was quite green, being still in the roasting ear state, though most of my neighbors at the time had nearly finished gathering fodder, and one of them had nearly finished cutting tops. The first row was left in a state of nature, with its blades, including the tops, entire, intending that this should be the standard by which I should judge of the loss or gain arising from each different method of treatment. The second row was deprived of both fodder and tops, which is the usual mode in Virginia. From the third row the fodder alone was pulled, which was done after the customary manner, i. e. all the blades below, and one above the ear. From the fourth the tops alone were cut—the fodder left untouched. The stalks in the fifth row were cut up near the ground, and placed in a shock. At the end of each row was left an indefinite number of stalks in their natural state—as those were in the row which it has pleased me to call my *standard row*.

The 10th of November, walking in the field, I just arrived in time to save this corn from being tossed like common ears promiscuously in an ox-cart. For one of the cartmen, after having wandered over the whole field, and hauled away all that had been made, on coming to this little corner, was quite indignant to find that it should have been skipped by the corn pullers, and had commenced with his own hands making havoc among the stalks, on which I had labored myself with so much care, and had lately watched over with such parental solicitude, in order to save from the equally desolating hands of the corn pullers. On examination, I found that he had pulled off 30 ears each in two rows, and these he had mixed with other corn. Thus my experiment was cut down to 20 ears. To prevent all future mishaps, I immediately had the remainder pulled, shucked, (husked I believe they say "down east,") carefully placed in separate baskets, carried home, weighed, labelled, and put away in my study. On the 1st of October, 1835, I examined my corn, and found it much infested by weevil, particularly that from the fifth row. I had it carefully shelled in my presence and weighed. The annexed table will will show the result. In the two last columns the loss or gain per acre, will be very *nearly* seen, as compared with the product in the standard row. In this calculation I have taken 56 lbs. as a bushel.

	Weight 10th Nov. 1834.		Weight Oct. 1st. 1835 (Shelled.)		Weight of husks or cobs.		Total—October, 1835.		Shrinkage.		Estimated quantity made per acre.			Loss per acre.			Gain per acre.		
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	Bushels.	lbs.	oz.	Bushels.	lbs.	oz.	Bushels.	lbs.	oz.
First row.—Standard. - - -	14		10	2	2	5	12	7	1	9	26	1	2						
Second row.—Tops cut and fodder pulled, -	11		7	14	1	14	9	12	1	4	20	23	7	5	46	9			
Third row.—Fodder alone pulled, - -	13		10	2	2	5	12	7		9	26	14	2						
Fourth row.—Tops cut, - - -	14	8	11	1	2	5	13	6		9	28	38	4				2	24	4
Fifth row.—cut off, - - -	15	8	10	14	2	5	13	3	2	5	28	11					1	52	14

The result of the experiment in the second row, is in accordance with what I had expected, and with what seems to be the opinion of all thinking men. From this, some idea may be formed of the immense annual loss to the corn crop in Virginia, from the general practice of stripping the blades from the stalks, and at the same time depriving them of their tops. The fodder from the 50 hills in the second row, weighed on the 10th of October, 1834, 5 lbs., which would be 290 lbs. per acre—that from the tops of the same row after being stripped, weighed $1\frac{2}{3}$ lbs. or 96 lbs. to the acre, in the whole 386 lbs. In this county, new fodder is generally sold at the stack for 50 cents per hundred—386 lbs. then can be bought at $1.63 —whilst the corn, when old, sold for many years past at not less than $3 per barrel. By comparing experiment second with experiment first, it is seen that by cutting tops, and pulling fodder, 5 bushels, 46 lbs. 9 oz. of grain is lost per acre. This at $3 per barrel, is worth $3.50—which is expended in order to get $1.63. But it is not clear that the labors expended in gathering fodder, is not worth as much or more than the fodder gathered. It becomes the Virginia farmers then, to reflect, that for the fodder and tops he is about gathering, he will throw away $3.50 for every acre in his field.

The product of the third row did not fall below the standard. In this row the tops were not cut, but the fodder was pulled; hence the great utility of the top may be seen.

The fourth row, in which the tops alone were taken off, has turned out entirely different from what I expected. I had been led to believe, from various communications, but particularly one from the pen of Mr. Clarke of Northampton, published in Vol. I. p. 70, of the Cultivator, from the New England Farmer, that the loss from topping corn was very great. The experience of Judge Buel and Lorrain, with that of many anonymous writers, all go in confirmation of this fact. It is then with extreme distrust, that I venture to differ from that opinion, particularly, since that difference will be founded upon this one isolated experiment, and that too, tried on so small a scale. But, since what will hold good as to 20 ears, will to 20,000—and as I am convinced of the perfect accuracy with which this experiment was conducted, I know not what to attribute this increase of grain to, unless it be to the cutting off the tops, particularly as it is more than probable that the product of these five rows would have been exactly the same, had they been similarly treated. I infer this, first, from the great sameness in the weight of the husks or cobs, looking as if they were cast in the same mould—second, from the like number of ears taken from stalks at the end of each row, whose blades and tops, as I have stated, were left untouched, all weighing in the same notch, when suspended from the hook of a steelyard, with $\frac{1}{4}$ lb. notches. The only difference was that the ears from the second row were, in common parlance, a "little more down weight" than the rest. Reasoning therefore from the experiment detailed above, I should say that the topping of corn, provided it is not done before the formation of the grain, is attended with a beneficial effect. It may be, that the top having performed its functions in the support of the tassel, which impregnates the ear, becomes a useless, and possibly a hurtful appendage. For it seems to be a settled principle in vegetable physiology, that after fructification has commenced, no further sustenance is drawn from the soil, but that all the juices which are necessary to the filling up of the grain have been elaborated, and are at this time in the roots and stalk. And I should infer that every thing that is requisite to save those juices from fermentation is, that there should be a sufficiency of blades through which they may circulate, and be exposed to the atmospheric air, by which they are deprived of their noxious principles, and thus fitted to support vegetable life, exactly as the blood is acted on through the instrumentality of the lungs, in the human system. But should these precious juices, (of which, after fructification has commenced, it is admitted there can be no further supply,) have too great an extent of surface over which they may circulate; the consequence is that they will be exposed to inevitable loss from evaporation: while the now useless top being cut off, the very juices that would be expended in its support, or lost through its pores, being diverted from their course, will gently ooze through the cob and become a part of the grain. Each and every part of the maize plant has its different functions to perform, and it seems to be the peculiar office of the top to provide for the maintenance and support of the tassel, and it is in that way alone that it indirectly contributes to the general welfare, and not in immediate preparation of food for the grain. In proof of this, I have frequently seen, on path sides, stalks whose tops had been drawn out while putting forth their tassels, bearing lustier ears than any of their neighbors, whose tops were entire. Nor is this on the principle of increase of size from emasculasion, as I have a vague idea that the editor of the Farmers' Register has somewhere asserted. This reasoning, though it may be just when applied to the increased size of the stalk, yet the analogy is lost when extended to the ears. This last proof, however, may be said to be taking the very question under discussion to prove itself, but it is only taking a fact that may have come under universal observation, to prove that the same fact may exist under different circumstances.

There is no plant sufficiently alike the maize that I know of, to support my reasoning by analogy, but in many of these of different genera, it holds good. Among the annuals, the product of cotton is notoriously increased by topping, though I do not know that the increase extends to the seed: this is the case with most or all of the cucurbitaceous plants, as cymblins, cucumbers, melons, &c. &c. Among perennial, the vine, the currant, the raspberry, &c. &c. are pruned and topped with signal benefit.

There is one argument which I am afraid the "followers of nature" will bring forward, that by a certain class, is considered as sufficiently great to upset the most potent reasoning, much less the fabric that I have attempted to rear on so tiny a base—to wit, that since the cutting off of tops causes a greater quantity of corn to be made, why is it that our Maker, (without irreverence I say it,) after the top has performed its office, does not cause it to wither and die, and drop off just above the ear? To these gentlemen I will simply observe, that never as yet has the Almighty, that I have heard of, (without irreverence I say this,) been seen to plant corn in drills, to hoe it, or to plough it, except through the instrumentality of man, and yet even they will not deny but that more corn will be made in this way than if they were to tread too closely in the footsteps of dame nature, and suffer whole ears of corn to plant themselves beneath the stalks where they grow—to stand without thinning, and to battle it out, alone and unaided, with the weeds, the crab grass, and the sorrel.

In this communication there is apparently a contradiction, and that too of so stubborn a nature that, to borrow a figure from yourself, Mr. Editor, I am afraid that I shall be unable even to "*neutralize*" it: it is this—in commenting on experiment third, I showed the great utility of the tops in feeding the grain of that row, just as much as the tops and fodder both did in the standard row: and yet in the whole of a very long argument since, it has been my whole drift and aim to prove that they were not only of no utility in feeding the grain, but that they were absolutely hurtful, wasting the food that was laid up for the use of the grain. These things conflict more in appearance than reality: for it should be remembered that I have not denied that the tops nourished the corn *when alone* on the stalk, but have only asserted that they take from the support of the corn, when fodder and tops *both* are left on the stalk. This will be evident by contrasting experiment first and fourth, for in the first where there were tops and fodder both, the corn would have made to the acre only 26 bushels 14 pounds—whilst the fourth, in which the tops were taken off and the fodder left entire, yielded 28 bushels 38 pounds—thus clearly proving that the tops had either wasted, or eaten, themselves, (no matter which, so far as the corn is concerned,) the food that would have raised 2 bushels and 24 pounds of corn. The only thing that can be deduced from their taking such good care of the corn when committed solely to their charge, as in experiment third, so that it did not fall below the standard, as did row the second when left destitute of both fodder and tops, is, that they are like some shepherd's dogs that I have read of, who would invariably eat the sheep when left to the care of the shepherds and themselves, but would guard them faithfully when entrusted to themselves alone. To be serious—as in organized beings, when one organ is destroyed, its place is in a great measure supplied by another—e. g. when persons have lost the use of their hands, they have been known to make up this deficiency by using their feet and lips, so as to sew, to knit, to cut most beautifully in papers, performing many mechanical operations with skill and dexterity. The loss of eyesight has been supplied by the senses of touch, and of hearing, &c. &c. And in plants, when the stem is broken from the root, in many instances the branches take their places, even becoming converted into radicles: so in the Indian corn, when the lower blades, in which I contend the sap is principally prepared for the nourishment of the grain, are stripped off the upper ones, in a great degree assume their office, assisting in the circulation of the sap, they so far change their nature as to absorb more from the atmosphere than they give out by their pores.

To reduce these facts and deductions to practice, (which, however, I should not advise any one to do, without further experiment, from their being so contrary to received opinion,) it seems to me that a farmer would get most grain to top his corn, and let his fodder stand. But since Eastern Virginia is not a grass growing country, and our horses and mules cannot live upon grain alone, it is a difficult matter to get a substitute for fodder, particularly for those who will not, or cannot raise clover. Farmers in this situation should make it an invariable rule when they pull their fodder, to leave the tops standing, and *vice versa*, in cutting tops they should suffer the lower blades to stand: in no case whatsoever should the same stalks be deprived of both fodder and tops.

But in my opinion we should be great gainers in changing our practice at once, and apply the hoe to the root of the stalk about the middle of September, with all its fodder and tops entire. The difference in grain between this mode of topping is only 27 pounds per acre, which is worth about as many cents, while the value of the fodder is to be taken in consideration, which can be saved nearly as well by cutting down the stalks, as by stripping the blades. This was evident from experiment the fifth, for when the corn was gathered from that parcel, on the 10th of November, the fodder on the stalks was sweet and well cured, though it had stood exposed to a great deal of rainy damp weather, which prevailed throughout the latter part of September, and first part of October of that year. The great saving of labor in gathering your fodder, your tops, and cutting down your corn (which has to be done soon or late) by one operation, should likewise enter into the calculation. Besides, you gain a very valuable food in your stalks, by cutting them while teeming with saccharine matter. This practice is not novel: it is carried out to a great extent in the northern states, and the experience of your correspondent Agricola, goes to prove that it is equally successful, as far south as Alabama. In addition to this, those farmers who follow the absurd practice of sowing wheat after corn, will be enabled by it to clear their ground for the wheat crop much earlier than they otherwise could, which is by no means an inconsiderable object in some years. In fine, to cut short fifty reasons that are springing up in my mind in support of this method, I see no earthly cause why the cutting up of corn before perfectly hard should not be attended with the same beneficial effects as it obviously is in the wheat and rye crops. This has been proved by the experiments of Monsieur Procquez, in an article translated p. 759, Vol. II. Farmers' Register from the *Journal d'Agriculture etc. des Pays-Bas.*

I will take this occasion to mention two facts, coming under my observation, which seem to me to conflict with some of the principles advanced in the Essay on Calcareous Manures. In the month of October walking by a brick-kiln that had been burnt the preceding year, and from which nearly all the bricks had been removed, I was surprised to see a most luxuriant growth of sorrel (*Rumex acetosa*) on the outer wall of the kiln, two feet from the ground. I suspected that its roots drew nourishment from some particles of soil, or charcoal that might have accidentally have lodged between the bricks. But upon examination, I found crumbled pieces of brick on the surface of the wall, through which the roots penetrated, without paying much attention to them, only now and then sending out a few fibres to forage. On coming to those that were sound, they adhered to their sides, after penetrating the crevices between the rows and layers: nor was there a particle of soil, or any thing else, perceptible to the naked eye, that could have afforded them food. After removing the sound brick, the entire plants came away, without any thing at all adhering to their roots. The earth of which the bricks were made, was taken three feet from below the surface—and even had there been any vegetable acid at so great a depth, I presume that it would have been expelled by the heat of the fire used in burning the brick—while the pyroligneous acid engendered from the decomposition of the wood by the fire, would not have remained adhering to the bricks, for which it has no chemical affinity, exposed for twelve months to the winds, and four months to the rains. If this be so, whence could this plant have drawn its acid properties? The constituent principles of the oxalic acid exists in the atmosphere, and it is admitted that the wood sorrel *(oxalis acetocella)* derives its acidity from the air; why then should not the sheep sorrel get its acidity from the same source? Should what I have related, afford ground for the belief that the sorrel derived its acid properties from the atmosphere in that one instance, my faith must necessarily be shaken in the very important evidence which you have brought forward in proof of the existence of acid soils, from the growth of acid plants thereon. It is not my intention to attempt to controvert your theory concerning acid soils, as I think it placed on incontestable ground; my only object, is to excite attention to the subject, so that all the facts existing in relation to it, may be made known.

My second fact is, that on a piece of land lately purchased by Mr. Thomas Roane, there is a marl bank, with large pines and broom-grass growing on it—while the marl is so near the surface as to be seen without removing the superincumbent earth, of which in fact there is little or none. I will not attempt to theorize on this subject for fear that I may expose myself to the getting of a rap over the knuckles similar to that which the unfortunate correspondent of the Genessee Farmer got, whilst wielding the pen against your "ideas about sour soils," by assuming that the "lime and gypsum, with the other peculiarities found in vegetables" were derived from the atmosphere.

Whilst my pen is in hand I feel constrained to give you a few *facts* in testimony of the truth of the principles divulged in your Essay on Calcareous Manures. In 1833, I first read the essay, and being convinced by it that farming in Virginia, with the means of marling, was not so desperate an undertaking as I had been led to believe it was, from witnessing the small crops of my countrymen in general; and not wishing to leave my native land, unless driven forth by the hand of dire necessity, I purchased a farm of 405 acres, at $5 per acre. To this I have since added about 600 acres more, at $8. (I mention the price of the land, that my fellow citizens of the north may know the cost of a farm with us—which by the way, may be bought 50 per cent cheaper now than when I purchased.) Both of these tracts superabound in excellent shell marl, which I commenced hauling out, with some vigor, on the 1st of April 1834, and by the 1st of October 1835, I marled between 430 and 450 acres, at the average rate of 350 heaped bushels to the acre. But the facts which I shall detail as coming under my observation, will be confined to about 50 acres of the most worthless land on the farm. Its natural growth, as I infer from similar and adjoining land in wood, is red and white oak, with a few pines and black-jacks, now and then a stunted willow-oak, with an undergrowth of whortleberries; there are slight indentations or basins frequently occurring, which hold water throughout the winter, a great part of the summer, and after every rain. There seems to be no *soil* at all; but the *ground* is of a whitish color—very miry in winter, and bakes after every shower; it is very stiff, and difficult to cultivate. The fencing had been taken from around the greater part of this land; young pines had commenced showing their heads, while the intervening spaces were covered with a meager growth of poverty grass. In the fall of 1833, I sowed fifteen bushels of wheat in about as many acres of land; twenty acres were ploughed up for corn—eleven for oats—while in the spring, four was marled, at 400 bushels per acre, manured and put in cotton. In August following on measuring my wheat, it turned out thirty-one bushels and a fraction—being very little over two bushels per acre; my corn measured eighteen and a half barrels of nubbings. I was absolutely astonished to find that the product of land could be reduced to so low a state. I have no doubt, that were any of our northern brethren to see this account, they would smile incredulously—but I can assure you that there was no mistake in the measurement, as it was made with perfect accuracy, and the land having been cultivated to the best advantage—as it was ploughed four times and hoed twice. If this picture should impress on the minds of any of the readers of this communication the magnitude of the attempt to bring this land from a state of almost absolute sterility, how much greater was the impression on my own mind, who had spied out its "nakedness, and beauty unadorned," with my own eyes—

> Segnius irritant animos, demissa per aures,
> Quam quæ sunt oculis subjecta fidelibus.

But determining to see what virtue there was in marl, I removed the stalks from the twenty acres; marled them, at 250 bushels per acre, and sowed in wheat. In January I covered the whole with finely rotted manure, twenty-five tumbril cart loads to the acre; sowed clover-seed, and plastered. The wheat having been sown too thin at first, was made much more so from being killed by the hard winter, and the fly. I think the crop was shortened one-half. The quantity made per acre was supposed to be six bushels. But this I determined not to leave to "guessing"—and as there was about three acress on which the wheat seemed to be as good as it probably ought to have been throughout the whole field, under favorable circumstances, from its having been more protected from the north wind by a wood, and the earlier scattering of the manure. I had an opportunity of testing the product, by actual measurement. For this purpose, I laid off an acre with the surveyor's chain—had the wheat on it reaped, shocked, and thrashed by itself. It measured thirteen bushels and one peck—weighing 62 lbs. per bushel. This land was poorer if possible than that yielding two bushels an acre the year before. The clover took well; it grew off luxuriantly, and though this is its first year, the greater part of it headed, attaining the height of eighteen inches, and two feet: together with the clover, a fine tall growth of carrot weeds has sprung up, a thing unprecedented in the field before. But this is not all: the four acres in cotton adjoining the rest, and managed alike, except being marled earlier and more heavily, after producing me a tolerable crop of cotton, and an excellent crop of wheat, was broke up in July for ruta baga. On going out to give some instructions about placing the manure, what was my surprise to see this poor stiff *clay* level, (or such as I and every body else had taken for clay) converted into a light sandy loam of a dark rich color, with scarce sufficient clay in it, to cause it to adhere, when pressed between the hands. I sowed my ruta baga seed the 20th July, and though nearly half of them died from my neglecting to have them worked soon enough, (and by the way they were only ploughed once,) yet after feeding away three-quarters of an acre, the remaining $3\frac{1}{4}$ acres made me 780 bushels. The ordinary weight was from six to eight pounds a turnip, while some carrots transplanted in the missing places attained a most enormous size, one of them measuring 14 inches in circumference.

The part in oats, after yielding but an indifferent crop, was marled in 1834, and put in corn this year—half was unmanured; the other half was manured with the half-rotted stalks from my farm-pen, mixed with coarse litter from the stable, which was ploughed under in the spring directly after being hauled out. From the latter I gathered an estimated crop of $5\frac{1}{2}$ barrels per acre; the former made me three,whilst one and a half acres, marled at 400 bushels, and not manured, made me nothing. It should be remembered that the same description of land,only separated by a road,made, the year before, very little over four bushels an acre, while the part not too heavily marled, with the help of a more favorable season, brought it up to 15 bushels.

My experience adds another proof to your doctrine, that marling and manuring ought to be carried on together: yet very many pursue a different practice. One of the most intelligent farmers in Hanover marls in one field, and manures in another, where there has been no marl carted.

From a close observation of the facts that have fallen under my notice, I am convinced that the most profitable application of fine rotted manure, is on the surface, to a wheat field that has been marled, and is intended to be sown in clover; whilst your unrotted manure (I use this term because best understood in Virginia,) should be applied to marled land, intended for corn, and turned under so soon as hauled out.

I have sown clover on similar soil, managed in six different ways. 1st. On land unplastered, unmanured, unmarled. This is throwing away seed. 2nd. On land manured, unmarled and unplastered—but little better. 3rd. Manured and plastered, but unmarled—the clover stands in spots, and grows tolerably well only. 4th. Marled, but unmanured and unplastered—the clover stands better, but the growth is not so great. 5th. Plastered and marled, but unmanured—better still. 6th. Plastered, marled and manured—a prodigiously fine crop.

These few things comprise most of the "facts" that have come under my attention during the two summers that I have been a farmer. I do not know that they are worth the trouble they will cause you to have them put in print. I have others in progress which it will take years to test, and should I live, and your journal continue to flourish, (both of which may God grant) you will hear from me in due time.

WILLIAM SPOTSWOOD FONTAINE.

Montville, King William, 12th Dec. 1835.

[We are much gratified that our "call for facts" has served to elicit the foregoing statement of experiments and observations. Although the experiments on fodder were on too small a scale, and otherwise too defective, (as is frankly admitted by our correspondent,) to be deemed conclusive in their results—still they leave little doubt of the injury sustained by the usual and almost universal mode of conducting this branch of corn culture. The increase of the corn supposed to be caused by topping only, we should attribute to some defect in the experiment, unsuspected by its maker. But this, subsequent and more full trials can best settle—and it is no small merit in a single experiment, if it can assure us on *one* useful point—or even serve to strengthen greatly, a doubtful opinion. It is by such courses of experimenting accurately, and reporting faithfully, that the best services can be rendered to agriculture—and it is hoped that Mr. Fontaine's good example will be followed by many others.

With regard to the facts presented as difficulties in the way of the theory of acid soils, we have to repeat, that we are not so presumptuous as to attempt to explain every rare exception, real or apparent, that any particular facts may present as contradictory of the general laws of the fertilization of soils which have been maintained in the *Essay on Calcareous Manures*. Some of the strongest apparent contradictions, however, have, on more full investigation, been found to be in strict accordance—and so may the facts observed and stated by our correspondent. The pines growing over a marl bed probably extend their long horizontal roots to some acid earth, or possibly find it even below the marl—as do plants of sorrel which often stand on unspread heaps of marl. The growth of sorrel on the brick-kiln, may prove that the atmosphere furnishes acid to that plant—but even then, it would not contradict the doctrine of acid soils, unless, the bricks, or the soils on which common sorrel *(rumex acetosa)* was thus air-fed, *were calcareous*—which, it is presumed will never be found to be the case.

Nevertheless, we are glad to receive, and as willing to publish, facts opposed to our views, as those which support them: and our correspondent may be assured that we have neither the inclination, nor ability, if so disposed, to return to him "a rap over the knuckles," as in the very different case to which he refers—which was that of objections being made (and through another journal,) which were founded on the most gross ignorance of the entire subject.]

TO MAKE GOOD BACON.

[Under the impression that we should thereby render an acceptable service to many readers, we sought some months ago the information which has just been furnished in the following communication. The business of curing bacon for sale has long been carried on very largely in Southampton, Isle of Wight, and other adjacent counties, and the quality of the article has become celebrated under the general name of "Smithfield bacon." We are not sure that the writer of the following directions designed that his name should be given, and therefore it has been withheld. No name would be better authority, for any statements whatever. In addition, the mutual friend through whom the communication was obtained, says in his accompanying letter, "I have conversed with other gentlemen who are well acquainted with the process of curing bacon, and all agree that these directions *in the main,* are right. Mr. —— of this county, who has a high character for making good bacon, agrees with the writer, except that the former does not suffer his pork to lie in salt more than ten days, usually. That however, depends on the state of the weather."]

From the Maine Farmer.

Agreeably to your request, of Saturday last, I proceed to make some remarks on the process of curing bacon, and which, if they are thought worthy, may be inserted in the Farmers' Register. They will be too late however, I apprehend, for the present season. It may be first premised that the curing of bacon is a practical art, which as, in this climate at least, it depends on several circumstances, and especially the varying state of the weather, can never be completely successful without the exercise of a judicious discretion. But there is no secret or mystery about it: yet many persons in the neighborhood where the best bacon is made, still obstinately follow the manner of their forefathers, and think they have good sound bacon. Were they to keep their whole stock however, until the month of August, they might see their error, as they would discover perhaps, that not a fourth part of it was sound.

The first requisite for good bacon is *the pork,* which must be really fat. Hogs more than one year old, and which have been raised poor, and afterwards well fatted in a short time *on corn,* are, I think, decidedly the best. The most convenient size is that of such as weigh between 100 and 160 lbs. Stye-raised hogs can never be made into the best bacon. Before the pork be salted it should have time to become perfectly cold, a circumstance indispensable perhaps to its sound preservation; and it is at least the safest course in our uncertain climate, to lose no time afterwards. The great improvement, which was made many years ago in the curing of bacon, amongst those who furnished the markets with what is usually called "Smithfield bacon," consisted in salting the pork more than once. This, with the use of saltpetre, which imparts a juiciness and flavor, which perhaps nothing else can supply to bacon, constitutes the only secret. Molasses used in conjunction with saltpetre, adds to its finishing relish. The latter article is never, I believe, used by professed bacon makers for sale, and saltpetre is not used by the large dealer, except for hams, and then in rather stinted quantities. The bacon of the small dealers is therefore much to be preferred.

The course which I pursue in salting my small quantity of pork, is as follows: as soon as the hams are cut out, a table spoonful of molasses is poured on the flesh side of a ham, and after being spread over it, a heaping table spoonful of saltpetre is put on, and rubbed into it. The hams thus prepared are then laid away until the rest of the pork is ready for salting. The same course I pursue with the shoulders, putting on a little less saltpetre. In salting, I use the Liverpool sack salt, and salt my pork always twice, sometimes, in doubtful weather, three times. The second salting should be about the third day after the first, at which time I put saltpetre, about a third as much as in the first instance, again on the hams and shoulders. Should pork be frozen when first salted, it should be resalted as soon as practicable after it thaws, as in that case there is often great danger of its spoiling. I put saltpetre on every piece of my pork, and use about five pounds to the 1000 lbs. of pork, It contributes, I believe, not only towards its flavor and appearance, but also, in a greater proportion than salt, to its preservation, and as a preventive against the worm, bug, and skipper. Care should be taken to let the brine drain off from meat in salt, and if it be salted in casks, there should be a hole in their bottom after the second salting, that the brine may escape, as its contact with the meat tends to injure its flavor. Pork should be allowed to remain in salt about four weeks, and longer, I think, if it be very large. I know however, one of the best makers of bacon who thinks that hams are injured by remaining so long in salt. But, in my opinion, if saltpetre be used in sufficient quantity, and the pork be *really fat,* bacon can scarcely be made too salt; and I should therefore be seldom in a hurry to hang it up. As good bacon as ever I have seen lay in salt more than three months.

The last operation in making good bacon is that of smoking, which is best done in clear, dry weather, and may perhaps be sufficiently well done with any kind of wood, though solid green wood, as oak or hickory, I take to be the best. Contrary to old opinions, the operation is best carried on in the closest smoke-house, and a considerable degree of heat too, is not, I think, unfavorable to the operation. What used to be called "fire tainted" meat is known now to be spoilt meat, occasioned by the unfavorable state of the weather, or its not being properly salted. Bacon can scarcely be smoked too much. The smokes should be continued at least until it has a dark reddish brown color. The joints should always be hung highest in the smoke house, for as they are more liable to be injured by the skipper, they will thereby be more out of the way of the fly which seldom ascends high, if it can find lower prices to pitch upon. Smoke-houses ought to be constructed so tight as to be dark when the door is closed. I have strong reason to believe that bacon which might be kept through the summer uninjured, in a dark smoke-house, might sustain much injury in one which was quite light.

By pursuing the course pointed out in the above directions, the writer of this has for many years past cured a small quantity of bacon of his own raising, and which he has been assured by many whom he considered as judges, was not surpassed in quality by any. To one of these, a distinguished member of the General Court, directions, substantially the same as the above, were given some years since, and published, as the writer understood, in the Compiler newspaper.

Isle of Wight, Dec, 21, 1835.

MARLING ON POOR LAND.

To the Editor of the Farmers' Register.

Though a stranger to you, I should, long before this time, have thrown in my mite to the columns of your very useful Register, (of which as a subscriber I have been a constant reader,) only from a consciousness of my inability to cope with your more learned correspondents: having never enjoyed the advantages of a collegiate education, I was forced to *graduate* in Petersburg over a jack-plane. After leaving Petersburg, I purchased a piece of land in this county, which was, notoriously, one of the poorest in the county—without buildings or other necessary improvements. My land, at the time I purchased it, was so poor, that I should have considered one half barrel of corn to the acre a *good crop.* Since that time, I have erected a comfortable dwelling, and other necessary houses, and improved my land to such a state, that I believe it will yield me from four to eight barrels to the acre in a tolerable season, and under fair circumstances. This, however, has been the result of constant labor and attention; but you see my labor has not been in vain. I have paid particular attention to the advantages of *marl.* In 1830, I commenced its use, being prevented attending to this branch of agriculture earlier, by having to attend to my buildings, and carriage-maker's shop. In 1831—32, I only gave a partial attention to this business, as much however, as my neighbors: but in the fall of 1832, and the winter 1833, I got out 33,000 loads of marl and other manure, upon 80 or 100 acres, and in the same year raised off the said field 350 to 400 barrels of corn—and having to cultivate my land upon the "two-field system," I raised, this year off the same field 500 barrels. I have this fall put a portion of this field, which is low, swampy land, say 12 acres, in herds grass, and having about 28 acres more of the same quality of land, I propose continuing from year to year to sow a portion in the same grass, until I shall have made meadow of all my swamps. As many persons, from an injudicious or ignorant application of *marl* appear to be prejudiced against its use entirely, I deem it necessary to say a few words in relation to it; not that I would at all dictate, but only offer the result of my own experience. It is thought by some, that to use it in *very small quantities* may, in some instances, be productive of benefit; while others appear to think its use so dangerous, or attended with so much risk, that it is better to dispense with it entirely.

The marl I use, is in strength, from 40 to 65 per cent. I have put as much as 800 bushels to the acre, and am of opinion that a much greater quantity might be beneficially used. At all events, my land, upon which in 1833 I put the 800 bushels, would now bear perhaps a similar quantity.* My mode of marling has been, to scatter through the fields alternately, one row of marl, and one of farm-pen manure, or woods litter—and from the happy effects of this system of marling upon my own land, I am of opinion that no man, who can procure marl in sufficient quantities, need any longer complain of poor land and light crops. From all this extra exertion of improving my land, and erecting my buildings, I need hardly tell you that I have run myself considerably in debt—yet by a correspondent in your 3d Vol. 8th No. page 454, I am somewhat encouraged: as the writer tells me, I may in future raise corn without cultivating it—and as this will save me considerable expense, I hope in a few years to be able to extricate myself from the difficulties under which I now lie—for if I could only raise six or seven barrels of corn to the acre, without the expense of cultivating it, I am sure that my net profits would be something considerable every year.

In conclusion, would it not be better, think you, if those persons who are suffering so much from an emigrating mania, would turn their attention to the improvement of their lands, and thus save themselves the trouble of going some hundreds of miles in order to raise good crops; this they might do, and still continue near the bones of their forefathers, and of all those ancient worthies for whose sakes we rejoice to be called Virginians.

THOMAS M. STUBBLEFIELD.

Corn Hill, Gloucester county, Va., Dec. 13, 1835.

*We warn our correspondent that he has encountered great risk of future loss, by such heavy marling on land naturally poor—and that nothing but also giving plenty of vegetable matter to the same land will secure it, even yet, from injury. His mode of using farm-yard manure may have been, so far, his safeguard—but its quantity will scarcely suffice for that, if he continues so to apply his marl, and over so much space. Ed.

CONVERTIBILITY OF WHEAT TO CHEAT.

To the Editor of the Farmers' Register.

A few days before I commenced cutting wheat, (1834,) a hail-storm passed over a part of the wheat field, and nearly saved me the trouble, though not the expense, of harvesting. The wheat came up nearly as thick as we sometimes see it about barn-yards. It continued to look as well as wheat (growing in grass) could do, until the last of September, when, on examination, more fly was discovered than I had ever before seen in wheat. Nevertheless, in the month of February following, it was the only wheat on the farm worth looking at. But as the spring advanced, it proved to be all cheat—for which I was prepared. You will of course see that I am one of the "clodpolls" who believe in the mutation of wheat to cheat—how else to account for more cheat growing on three acres of the last year's stubble field than ever vegetated on the whole farm from 1798 until 1835, I am utterly at a loss. I give you facts. Your own opinion on the subject is well known to me.

The corn crop of this year is not more than a fair average.

THOMAS CARY NELSON.

Bleak Hill, King William County, Nov. 25th, 1835.

Frederick, Va., Sept. 26th, 1835.

Sir, Mr. H. will deliver you a small package containing a root bearing apparently wheat and cheat, for your inspection, which I have taken the liberty of forwarding to you for dissection, to ascertain if we are correct in the opinion, that it is but one root. Should it be found, on examination, to be but one, it will tend, in some measure, to settle the much disputed question of wheat and cheat being the legitimate offspring of the same parent, that have been estranged from each other by disease or decrepitude. If convenient, you can state the result of your examination in the Register, for the information and gratification of its numerous readers, who may be pleased to know the result.

NATHANIEL BURWELL.

[The package referred to above was lost or destroyed by accident, while in the charge of the gentleman who would otherwise have delivered it. If it had reached us, every care would have been used to insure a fair and complete examination, and a correct report of the facts ascertained. As it is, we have only to present, in the foregoing letter, the additional and highly respectable authority which exists for the appearance favorable to that side of the question to which our individual opinion remains opposed.]

For the Farmers' Register.

THE PROPOSED AGRICULTURAL CONVENTION.

If the plan of an agricultural convention which has been proposed in the Farmers' Regester, should be approved and carried into effect, it will be well for every individual who may propose to attend it, previously to take into consideration, and to mature his own views in relation to each of the several subjects which he may deem proper for discussion, and the action of the body. Without much of such previous and separate consideration, there may be a numerous meeting, and containing the most intelligent and able merbers of the agricultural interest—and yet nothing be done, because nothing had been previously digested, and that the meeting would not continue long enough for mature deliberation to be both commenced and finished. The adoption of undigested opinions, and hasty and injudicious action, will do more harm than good to the cause of agriculture. Upon this ground, I hope it will not be deemed too presumptuous in an unknown individual to mention the subjects which appear to him deserving of the attention of an agricultural convention. As I merely design to offer hints, for the consideration of others of more influence and talent, I shall not argue in favor of the absolute or relative importance of any subject. It will be for others to receive and improve on such suggestions—or to reject them, if unworthy of notice.

In addition to the establishment of an agricultural professorship, as recommended by the proposer of the convention, I would call to the recollection of your readers the several other institutions recommended to the fostering care of the government of Virginia, in several Nos. of your 1st and 2nd volume. These were (as well as I remember, not having all the Nos. now at hand,) agricultural societies upon a proper plan—schools for instruction in practical agriculture—a model farm—and an experimental farm. All these are important objects, in comparison with which, the suggestions which are submitted in the following queries may seem scarcely worthy of notice—nevertheless, I will state whatever occurs to my mind, however trivial may be the benefit which its adoption would promise.

Would not agricultural knowledge be greatly advanced by the general adoption of agricultural class-books for common schools, instead of some of the usual northern compilations, from which no useful information is derived? If very generally used, such books on different branches of agriculture and domestic economy might be sold at as low prices as any whatever, and would serve as well for boys to learn to read, and at the same time fix on thousands of youthful minds directions for their future labors, which in most cases in no other way would be read. Even if such a substitution of school books produced no important benefit, it would not cost an additional cent's expense, and could do no possible harm.

Would it not be advisable for the Convention to leave to different committees the task of considering and reporting on, at a future time, all the subjects affecting agricultural interests on which no immediate action can be had? The reports of such committees would have no obligation, except the moral force which truth and reason always ought to have—and they might engage the minds and pens of some of our ablest men, and bring forth varied, extensive, and most important views, as to the interests of agriculture, aud the means for promoting them.

A SUPPORTER OF THE INTERESTS OF AGRICULTURE.

[There has been a strange and blamable remissness in giving notice to the public of the meeting of the Agricultural Convention, to be held in Richmond, on the second Monday in January—and it is feared that many zealous and able friends to agriculture, will thereby be kept ignorant of the time, until it is too late. Our views in support of this important measure were stated at sufficient length, when the proposition was first published in a former No. of this journal. There has never before occurred an opportunity by which more could be done for the agricultural and general interests of Virginia—and there certainly never was a time when they more needed the zealous and efficient support of every true Virginian.

It is very lately that we have learned that delegates to the Convention have been chosen by the Agricultural Societies of Albemarle and of Fredericksburg. Those chosen by the Agricultural Society of Buckingham were announced in our last No.—and as that is the only official notice that has reached us, perhaps appointments have been made by other societies, of which we have not yet heard. But the delegates from societies will form a very small part of the convention. Every one having an interest in agriculture has been invited to attend—and it is hoped that a numerous assemblage will be there, ready and zealous for action. An interest in the welfare of agriculture is the only requisite for admittance—and an earnest desire to promote agricultural improvement will alone render any member useful, and his presence and support valuable.]

FURTHER NOTICE OF THE PRAIRIE SOILS OF ARKANSA, WITH SPECIMENS AND THEIR LOCALITIES PARTICULARLY DESCRIBED.

Hempstead county, Ark. Ter.
Oct. 24, 1835.

To the Editor of the Farmers' Register.

Agreeably to your request, I send you specimens of our prairie and woodland soils.

A section made near the point of a ridge, grown over with stately pine, oak, and hickory, sloping on their sides at an angle of 30 degrees, and bordered with a naked prairie at 30 feet distance. A surface of three inches depth composed of decayed vegetation with a little sand, was removed, when a stratum of red clay, 12 inches deep, was exposed—(No. 1.) Next was a blue clay, 12 inches deep, (No. 2.) Next a dry pulverulent substance, (No. 3,) of about the same depth, which appears to be identical with No. 4, taken from 12 inches below the surface of the naked prairie adjoining. No. 5 was taken from immediately above the latter, and six inches below the surface sod of the naked prairie. No. 6 is a pulverized specimen of the dense substance that underlies the whole of this section of country, and was taken from immediately below No. 4. It is deposited in strata of from four to six inches thick, and is occasionally interspersed with strata of a substance resembling No. 2. Wells or graves dug on any of our upland, whatever may be the surface soil, invariably, at various depths, penetrate this material, and it has not yet been pierced through by our deepest wells. It seems, as I formerly stated, to form the basis of our rich black soil. Though of a light color when first exposed to the light, yet when slaked by the elements, and mixed with sand, clay, and vegetable matter, it becomes of a deep black, and accumulated in our valleys by washing rains, constitutes our canebrake uplands. This quality of soil has, this past season, produced 100 bushels of corn to the acre—wheat 15 to 20 bushels, and cotton 1500 weight. It was not injured by the severe drought in the spring, nor the excessive rains in August. No. 7 is taken from the wall of the ditch cut through the alluvial bottom of my field, six feet below the surface.

The specimens, except No. 6. when first taken up, were coarsely granulated, moist and pasty, easily mashed between the thumb and finger. They were afterwards dried and pulverized for the more convenient transmission.

The whole surface of the uplands lies rolling, with gentle swells, and the substrata betray the same inclination. The soft limestone frequently crops out at the surface, where it is dissolved by the weather, and is washed to where it is mixed with the vegetable matter of a lower level, and loses its distinctive color. If carbonate of lime be the *sine qua non* in the composition of rich durable soils, we have it in abundance.

I have to thank you for the file of the Farmers' Register, and your Essay on Calcareous Manures, as well as Mr. Featherstonhaugh's report. It is much to be regretted that Mr. F. did not direct his investigations more with a view to the promotion of agricultural science. The mystery of nature's operations in producing food for animated beings, the materials she works with, and the modes of combining them, come legitimately under the head of geology, and is to that science what physiology is to anatomy; and in the course of improvement for which the present age is remarkable, we may expect to see geology, chemistry, and agriculture associated, and taught together in our institutions of learning.

N. D. SMITH.

[The specimens described in the foregoing letter were requested of our correspondent, and selected by him (with respect to their location in both prairie and woodland,) according to our general directions. The interesting, though too general information on this subject, furnished by a former letter from Dr. Smith, (page 273, Vol. III. Farm. Reg.) induced our seeking from the same source what was more precise. It was supposed, that specimens of soil and subsoil, taken in both woodland and prairie, where there was an abrupt line of separation, and where these different kinds of land, preserving all their peculiar features, approached closely to, or actually touched each other, would best serve to prove, or disprove, the truth of our views of prairie soils. The specimens were well chosen for the object, and their respective proportions of calcareous ingredients, as tested by our analyses, furnish new and strong supports of the doctrine maintained at length in No. 6, that such differences in soils were the usual and sufficient causes of the formation of prairies in some regions, and their non-existence in others. These specimens show that a body of soil and subsoil, both not much exceeding two feet in thickness, being destitute of carbonate of lime, can sustain a growth of large and flourishing trees, though the earth beneath is highly calcareous; but that where the surface, and also the lower beds, are calcareous, trees are no more seen, and the land is a perfect prairie.

The specimens described above, on being submitted to chemical tests, gave the following results:

From Woodland.

No. 1.	Red clay,	100 parts contained of carbonate of lime—none.
No. 2.	Blue clay subsoil,	
No. 3.	Still lower,	27

From Prairie land adjacent.

No. 5.	(6 inches below the surface sod,)	28
No. 4.	Lower—(12 inches,)	58
No. 6.	General character of soft rock, (the "rotten limestone" of Alabama,) which underlies the whole country,	77
No. 7.	Alluvial soil—contained no carbonate of lime.	

From the Transactions of the Geological Society of Pennsylvania.

ACCOUNT OF THE TRAVERTIN DEPOSITED BY THE WATERS OF THE SWEET SPRINGS, IN ALLEGHANY COUNTY, IN THE STATE OF VIRGINIA, AND OF AN ANCIENT TRAVERTIN DISCOVERED IN THE ADJACENT HILLS.

By G. W. Featherstonhaugh, Geologist to the United States, Fellow of the Geological Societies of London and Pennsylvania, &c.

In a report lately made to government, and recently published by order of both houses of congress, I have at page 21 spoken of a rare geological phenomenon, in the valley of the Sweet Springs, Virginia; the which, as it is connected with the structure of the Alleghany ridges, I am desirous of giving a more full description of, for the transactions of the Geological Society of Pennsylvania.

The principal ridges of the Alleghany elevations have a general parallelism to each other, and coming from the north, run in a S. S. W. direction through the state of Virginia, until they blend with the table lands that are bounded by the carboniferous beds of the Cumberland Mountains, in the state of Tennessee. Many of the valleys between these ridges are intersected by numerous knobs, outliers and spurs, which, at inferior elevations, are connected with the main ridge. The White Sulphur Springs, in the county of Greenbrier, rise at the western foot of the main ridge, usually passing under the designations of Alleghany and Backbone mountain, on account of its being a watershed for the heads of various important streams, which empty into the Ohio river at the west, and into the Atlantic at the east.

In passing from the White Sulphur to the Sweet Springs, a distance of about 18 miles, the direct course would be nearly south, but there is a good main road, which passes somewhat obliquely through numerous romantic dells and defiles of the Backbone Ridge alluded to, into a broad valley, bounded by an inferior ridge, here called Peter's Mountain, at the foot of which the Sweet Springs rise. This is the same ridge which, 50 miles to the north, is called Warm Springs Mountain, the Hot and Warm Springs of Bath county bursting out at its western foot.

This valley, like many of the others, is agreeably diversified by hummocks, spurs and knobs, all well wooded, and interspersed with numerous sequestered coves, and wild looking little vales, which separate them.

I had an opportunity during the past summer of examining this part of the country, and found some important beds of anthracite coal on the eastern edge of the main Alleghany ridge, about eight miles south of the White Sulphur Springs, and lying off two or three miles from the main road. About 14 miles from the White Sulphur, the elevations recede, the country begins to open, and a very rich bottom of land presents itself, through which the waters of the Sweet Springs flow after they have left their source. The soil here is extremely fertile, bearing luxuriant crops of corn, and indeed nothing can be more beautiful than this valley opening as the traveller advances, and bounded by Peter's Mountain.

At the foot of a graceful knoll which extends about three quarters of a mile to this mountain. the Sweet Springs break out very copiously. Before they have left the spring 100 yards, they begin to deposite carbonate of lime, which has formed a regular travertin on the sides of a brook running near the enclosure of the establishment. This brook gives a stream, which, as I have before observed, runs through the rich bottom land. The stream runs for near two miles from the Sweet Springs, until it reaches a fall of about 75 yards, where there is a saw mill. This fall is about 550 yards across the valley, and the people of the vicinity call it the Beaver Dam, supposing it to have been constructed by the beavers, as many logs are lying on the slope, which, without reflection, may be thought to be the remains of an ancient structure erected by these animals. On examining this fall, and its broad slope, now entirely grown up with bushes and brakes, I was surprised to find that the whole slope consisted of calcareous matter of the same character as that I had observed at the Sweet Springs. It was evident, therefore, that the stream, now only a few yards broad, had once covered the whole surface of the valley; that the rich bottom had once been a pond dammed up, and that the water had been discharged as in ordinary dams, over the whole breadth of 550 yards. If this were so, it struck me that the flat land at the bottom of the slope must have been also covered by this calcareous stream. On examining it, I found it to be the case, and following it up for near three quarters of a mile over the travertin, I came at last to a cascade 42 feet high and about six feet broad. The stream was here projected in a very beautiful sheet upon the lower grauwacke slate, which in many places had a stalagmitic floor of travertin upon it of a foot thick. Having scrambled down to the slate, I had a front view of the cascade, with the whole ledge of travertin it was projected from, together with the infinite variety of stalactitic rods and pilasters depending from it. I observed a hemlock tree, *Abies Canadensis*, about forty years old, in full life, incrusted, all its roots and about seven feet of the stem, with calcareous matter.

Near the foot of this wall of travertin, more than 40 feet high, were the entrances to various caverns, similar to some spacious ones I had entered in the calcareous dam I have spoken of, with depending stalactites, in some instances resembling filagree work and petrified mosses, the fretted appearance of which is caused by the spray of the cascade. And here I would remark, that mineral waters of this character deposite their solid contents most rapidly when they are in quick motion and at shallow depths, the water being then more completely submitted to the action of the sun, and rendered less capable of holding the calcareous matter in solution. This I suppose to be the cause of the broad calcareous slope which has been attributed to the ingenuity of the beavers. When these valleys of denudation were scooped out, and a deep ravine formed where this rich valley bottom now is, the stream at this place probably passed over a rapid, that breaking the water produced the deposite in question, which constantly rose in height until the aqueous volume diminished to its present size, by the filling up of the ravine with calcareous and vegetable alluvial matter, converting the bare slaty bed of the ravine into a fertile valley, capable of producing 10,000 bushels of Indian corn annually; a singular instance of the benificent manner in which nature operates in favor of man. For here we see the springs of life not only issuing from the depths of the wilderness to restore the enfeebled constitution of the suffering southerner, but that portion of them not directly applicable to his wants, mechanically engaged, by a most happy process, in producing the means of sustaining those who here seek relief, and of embellishing every thing around them. These are amongst the charming lessons we receive from nature, and which dispose our hearts to see a divine care for us in every thing.

I was one day returning to my cabin, with some specimens of this travertin, when I met Mr. Rogers, the landlord of the establishment at the Sweet Springs, an old inhabitant of this part of the country, and a very intelligent and worthy person. He assured me that, some years ago, when hunting deer in the hills, he had seen some rocks exactly resembling them. As he is a man of very good judgement, I proposed to him to accompany me there, and he cheerfully assented. Mounting his horse, and accompanied by myself on foot, we went about six miles in a north direction; but so many years had elapsed since he had casually observed the place, and the deep dells and hills, clothed with their everlasting woods, resembled each other so much, that we passed an entire morning wandering about, climbing one hill and descending another, till I began to think he had been mistaken, and told him so; but he proposed trying another hill side, called Snake Run Mountain, and there I followed him. Being in advance of me, I heard him hallo, and immediately knew, from the cheerful sound of his voice, that the game was found. He approached me, holding in his hand a piece of very ancient travertin, which I recognized at once: and leading me to the brow of a hill, at least 350 feet above the level of the Sweet Spring, I saw, to my great surprise, a huge mural escarpment of travertin skirting the brow of the hill, with the weather-worn remains of old stalactites, whilst the body of the rock resembled in every particular the recent one at the cascade, abounding in large pipes of calcareous matter, which had formerly enclosed logs and branches of wood. The pendent stalactites consisted of concentric circles, and there was the complete evidence that a stream of mineral water of great breadth, containing carbonate of lime, had for a great length of time passed over this brow and formed the rock. The surface of the rock in many parts was interspersed with what are vulgarly called pot-holes, being circular perforations made in rocks by pieces of rock and gravel, kept whirling in them by streams of water, similar to those which I have seen at the summit of the lofty hills of Lake George, in the state of New York. This Snake Run Mountain stood as I found by compass, N. N. E. by E. from the Sweet Springs; and Peter's Mountain, of which I could get a peep through the trees, bore east of the place where I stood.

Here was an extraordinary phenomenon! an immense deposite of travertin lying 350 feet above the level of the spring from which it probably was derived. It seems to be susceptible of no other explanation, than that the level of the valley was, at some remote period, much higher than it is now, and that the springs were at least at this level. The Snake Run Mountain is a large limestone outlier from Peter's Mountain, such as are constantly found in the valleys. Before these were scooped out by the retiring currents, it is probable the whole surface of the now deeply sulcated region was continuous, and that the springs issued from the bottom of the ocean. When the valleys were swept out, these knobs, hills and spurs, being hard compact transition limestone,resisted,and were left; whilst the conglomerates, shales and sandstones, were carried away: since that period, the softer parts of the formations occupying that part of the valley where the springs now are, have been gradually worn down, and a new direction given to the stream, whilst the old travertin remains a monument of the ancient level, and one of the strong geological proofs of the process of denudation.

These mountainous countries have undergone great changes. I frequently found fragments of conglomerate sandstone (old red) abounding on the slopes and in the valleys, together with slabs and pieces of encrinital limestone, which are not to be found *in situ*, except this last, which I found near the summit of White Rock Mountain, a conspicuous eminence, a few miles west by south from the White Sulphur. The conglomerates appear to have lain above the highest existing summits, and to have been swept away.

From *British Hus'andry.*

ON PUTRESCENT MANURES.

Putrescent manures, as we have already seen, consist of all animal and vegetable substances which can be reduced through decomposition, fermentation, and putrefaction, into such a state as will render them fit to assist the melioration of the land, and to forward the purposes of vegetation. When combined, they form a saponaceous, solid mass of great nutritive power, well known to farmers under the common term of "muck;" which, although seemingly an uncouth expression, conveys an idea distinct from that which is meant by dung. Of these, the most generally useful are composed of the excrements of animals; for that which passes through them is not composed alone of the residue of their food, but also of certain secretions of other matter in the intestinal canal, so that the dung, even of those which are supported entirely on vegetables, partakes more of an animal than of a vegetable nature. The food on which they are supported, and their state of flesh, also make an essential difference in the quality of the manure. If the stomach of an animal be filled with provision which contains but little nutriment, and which is composed of fibrous matter which it is difficult to decompose—for instance, straw alone, without grain—this will pass through the intestines in almost the same state as it was eaten. The dung will contain less of that secretion which belongs to animals whose flesh has not been deprived of its nourishing juices; though even this small quantity serves to give the straw a stimulus to putrefaction. But the excrement of animals which have been supported upon nutritive food—as corn and pulse, or the oleaginous seeds of rape and linseed, though given in the shape of cake—and which are thus maintained in high condition, imbibes much of that property to which we have alluded, which thereby yields a more fertilizing manure than that furnished by lean stock. This, indeed, is strikingly exemplified by the difference observable in that produced by stall-fed cattle, and those kept in the straw-yard; and there can be no doubt that the fatter the animal the richer will be its dung.*

It has been thought that the dung of ruminant animals—oxen and sheep—when pastured, is preferable to that of horses, also kept at grass, which is supposed to be owing to the greater quantity of animal juices secreted with their food in the act of chewing;† but the fact requires to be established

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*It is stated in the Norfolk Report, that 10 loads of dung from cattle fed upon oil-cake, have been found to answer as well as 16 from beasts fed upon turnips.—p. 420.

†Outlines of Agriculture, by A. Hunter, M. D., F. R. S., &c. p. 11.

by a more minute and critical analysis of its properties. All animal manure, however, partakes in its fertilizing properties of the richness of the food by which it has been created; yet experience proves that its immediate powers are in several instances widely different. Thus the ordure of a man and that of a dog, though fed upon the same food, is so wholly distinct in its effects, that the excrement of the latter is used instead of bark in the process of tanning goat-skins for the production of morocco leather. Pigeon's dung, too, is hotter than that of other fowls,* though both are fed alike; and is said that a celebrated foreign chemist—M. Vauquelin—has not only lately discovered a very remarkable difference between the dung of cocks and hens, but that there also exists a sensible distinction between that of hens which lay, and of those which do not produce eggs! However deserving those researches may be of inquiry, and however important they may hereafter prove, if followed up with regard to the larger animals, it would yet be difficult, and perhaps, under all circumstances, unnecessary, to state the differences of the comparative character and value of these and various other putrescible bodies—such as fish, spoiled flesh, and many other substances, which, though all, no doubt, useful to vegetation, when they can be procured on such terms as that the farmer finds they can be profitably applied to his purpose, are yet seldom found in such abundance as to require a separate account of the properties of each. We, therefore, do not deem it necessary to pursue that portion of the subject farther, and shall accordingly proceed to the consideration of that compound of vegetable and animal substance so well known under the title of

Farm yard Manure.

This must ever be ranked in the first class; and when improved yards have been constructed for the soiling of cattle, and attention has been paid to the quality as well as the increase of their dung, the manure thus produced becomes of inestimable value. No husbandman can carry on his business without it, and every one who attends for a moment to the difficulty of procuring a sufficient quantity of dung, as well as of preparing what is got, will acknowledge, that however imperfectly the subject be understood, none is more deserving of serious investigation; yet even the most superficial observer on the common state of culture can hardly fail to remark, that the evident inattention to its management is such as would almost lead to the supposition that it is not worth the pains of the farmers's care. Nothing is more common than to see large heaps of manure thrown out from the stables and feeding-sheds, and exposed in that state to the weather, without any regard to its being either laid up in a regular and careful manner, secured from evaporation, or carefully mixed in different proportions,according to its various qualities; yet these proportions are severally of a very distinct and important nature.

When *horse-dung* is sufficiently moist, and is exposed to the action of the air, it speedily enters into a state of fermentation, which is necessary to mix and assimilate its watery, oily, and saline parts; but if care be not taken in that process, it exhales so much heat that it soon becomes dried up, its volatile particles are evaporated, and it easily crumbles. If the parts of which it is composed are not also so compactly heaped as to exclude the air, they become likewise unequally decomposed, grow mouldy, and the whole mass is thus deprived of much of its fertilizing power. If, however, the natural moisture be retained, or it be regularly and moderately wetted, it acquires almost the consistence of a paste, or that state which is called *spit-dung;* and if it be laid upon the land before it is entirely decomposed, its effects upon vegetation are prompt and powerful; which is partly to be attributed to the heat which is developed anew, when, after being ploughed under the soil, its decomposition is completed. This occasions it to act with singular efficacy upon lands which are cold and clayey, the faults of which it tends greatly to correct, and the soil is much benefited. It also greatly improves land which abounds in vegetable mould, because the ammonia contained in the manure favors its decomposition.

When completely decomposed, and thus reduced to the condition of *rotten dung*, it is much lessened in quantity, but that residue contains the essential part of its substance, which is highly favorable to vegetation on land of every kind with which it is incorporated. In this state, however, it is often productive of bad effects upon dry, sandy, chalky, or other light and calcareous soils; for there it stimulates the plants too powerfully at the first period of their growth, so that when the action of the dung has ceased, vegetation becomes languid; in corn crops great bulk of straw is produced, but the grain is apt to be deficient. It is also less durable, because it is consumed by the excess of its own fermentation, and its powers being thus exhausted, it has but little effect upon the future crops on such land.

The *dung of horned cattle* also soon ferments when it is collected into a heap, and is only moistened by its own humidity; but this process is slower than in the dung of horses, because it is not so much exposed to the same internal heat, in consequence of which the evaporation is less, and being ordinarily voided in a very moist state, it does not require to be wetted. Neither is it subject to crumble; but it rather becomes a mass of unctuous substance, which it retains until its moisture is entirely exhausted, when it assumes the appearance of dried peat, or turf, and when not well mixed with the earth, it is found in the land in clods sometimes so long as two or three years after it has been laid on. Its effect upon the soil is slower than that of horse dung: it has been also considered more durable; but, as we have already observed, this latter effect must in great measure depend upon the nature of the food by which it has been produced. Whatever may be the degree of fermentation at which it has arrived, it does not seem to occasion any perceptible heat when laid upon the land; for which reason it is best adapted to dry and warm soils. Thus, upon sands and gravels, which, from their nature, are apt to be hot, its cooling qualities counteract that effect, and upon such land it has been found of infinite service; but upon strong clays, it appears to be nearly inoperative if buried under the ground,

*By an experiment stated in the Agricultural Magazine, it was found that the dung of hens was found more effectual than that of ducks; while that of geese was scarcely perceptible as a manure.

and not exposed to contact with the atmosphere by repeated ploughings. When used alone, it has, however, been considered, in most instances, as nearly worthless;* and the most advantageous mode of employing it, is to form it into a compost with the other contents of the farm-yard. It has also been thought that the dung of milch cows is inferior to that of oxen;† but this can only be attributed to their yield of milk, which probably deprives it of some portion of its richness, and when they are dried off and fattened, there is no perceptible difference.

Sheep-dung decomposes quickly when it is moist and compactly heaped together; but when dry and dispersed, its decomposition is slow and imperfect. Its effect upon the soil is soon dissipated, and is generally exhausted after a second crop. Much ammonia is disengaged from the excrements, and more especially from the urine of sheep, and this renders their manure particularly valuable upon soils which contain insoluble mould. That which is found on the floor of sheep-cotes, when left undisturbed, is of two qualities—that of the upper layer, which is occasionally renewed with fresh litter, being strawy, dry, and not fermented; while, on the contrary, that of the under layer is moist, clammy, and fit for use. When the dung is removed, care should therefore be taken to mix both layers, so that they may be equally decomposed; and, when thus prepared, the manure should be spread sparingly upon the land, if used for corn crops, or it is apt to make them run to straw: but upon cold, sour soils, this unfermented dung may be used in large quantities with considerable advantage. The most usual way of procuring it, however, is by folding, under which head it will be separately treated when we come to the subject of sheep. Here, therefore, it is only necessary to remark, that it appears, from an experiment on record, that 134 ewes and wethers, with 30 lambs, were penned during six weeks in a sheep-cote, and littered with one load of straw per week, which produced 28 large loads of dung: thus—

	£	s.	d.
Valuing the dung at 7s. 6d. per load	10	10	0
Straw, at 69 cwt. 1 qr. 20 lbs. at 20s. per ton, or about	3	10	0

this would leave £14 for the manure. But these sheep consumed the produce of two acres of drawn turnips; in which time, according to all common calculation, they would have folded two acres, without the expense of either taking up the crop, or of spreading the dung.‡ In another standing fold, containing an English acre, the plan adopted was to spread the straw a foot deep, and strew turnips upon one-half of the fold every two or three days alternately, until the litter become wet, when it was again covered with fresh straw: the sheep thus lay very dry; and in this manner, it is said, that, in the course of the season, 800 tons of the best manure upon a farm in East Lothian was produced by 308 wethers! The quantity, indeed, appears so very extraordinary as to seem almost incredible, and had it not been stated on the respectable authority of Sir John Sinclair, we should have hesitated to afford it insertion:* but—though not so stated in his account—it is probable that the fold was also deeply bedded with sand.

Swine's dung is, by many persons, considered as the richest of all animal manure, except night-soil; while others view it as being of a cold description. It is of a soapy nature, is slow of fermentation, and when laid upon very cold soils, it should be mixed with horse-dung: for although its stimulating powers upon vegetation are very great, yet of itself it does not heat sufficiently to destroy the seeds of weeds. Mr. Malcolm, indeed, says that he has often seen it applied to land consisting of a shallow loam upon a fine gravel, and land of a sandy nature, in which soils it has filled the ground with weeds, particularly the May-weed; and in a hot season a crop of barley has been entirely burnt up.† The loss of the barley-crop may however be partly attributed to the dryness of the season, and the foulness of the land to the want of good culture. Any ill-managed manure may be full of the seeds of weeds, and therefore they may be sown with it. But it is a futile charge against any species of manure to say that it encourages weeds; for it is evident that if the land were clean, the same stimulus which acts upon them, would be applied, in like manner, to the crop of grain intended to be cultivated. We do not hear such complaints from farmers who drill their corn and effectually hoe the intervals. When, therefore, it is considered that vast quantities of weeds are usually cast into the pig-sties, many of them bearing seeds fully ripened, it will be evident that caution is requisite to destroy their vegetative powers before this manure is laid upon arable lands. On this account, nothing can be more proper than to form a dunghill by a mixture from the pig-sties and the stable. The well-known property of horse-dung to ferment freely, will completely effect what is required, and the compost will be found most valuable. The worth of manure from the pig-sties will however depend much upon the mode in which it is prepared. If the litter be often renewed, and it be kept dry, either by sloping gutters, or by means of holes bored in the planking of the floor, then the straw will retain but a small quantity of the urine, and will be productive of little other effect than if it were merely rotten. But if it be allowed to become saturated with the urine, by stopping those drains, and care be taken to preserve the litter in a proper state for decomposition, it will ferment rapidly, lose its coldness, and become a very strong manure. The necessity of cleanliness in the stye is a consideration apart, which belongs more properly to the future subject of the treatment of hogs.

*An instance is mentioned in the Essex Report of 15 acres having been manured for beans—6 with horse dung, and 9 with dung from the cow-yard; and that the 6 acres produced far more than the 9.—Vol. ii. p. 230. In an experiment made near Grantham, in Lincolnshire, on a poor dry soil, the manure from a horse-yard, and that from a yard where neat cattle were wintered, were used separately for turnips, and the former was found to have greatly the advantage.—Sinclair's Code of Agriculture, 3rd edit., note, p. 214.

†Bedfordshire Report, p. 509.

‡Complete Grazier, 5th edit. p. 258.

* Husbandry of Scotland, vol. ii. App. p. 47; and Gen. Rep. of Scotland, vol. ii. note p. 511.

† Survey of Surry, Kent, and Sussex, vol. ii. p. 27.

A full stock of swine effect very great service when permitted to run loose in farm-yards where much straw is used; they highly enrich it by their dung and urine, and mechanically promote the decomposition of its woody fibre by the manner in which they constantly work among it—breaking it to pieces, and thus rendering it more manageable on arable land, even when in the earliest stage of decomposition. They have, indeed, been strongly recommended by Mr. Blaikie, who advises, in his very judicious essay on farm-yard manure, 'that those industrious and useful animals should be attracted to the yard, because they rout the straw and dung about in search of grains of corn, bits of Swedish turnips, and other food, by which means the manure becomes more intimately mixed, and is proportionally increased in value.'* Great inconvenience has, however, arisen from allowing them to run about the buildings, through the difficulty of preventing them from getting out, and damaging crops and fences; wherefore many farmers have adopted the plan of having paled yards, with open sheds, for the sole purpose of keeping their store pigs.

Urine, although essentially composed of water, yet contains much of the elements of vegetation in a state of solution peculiar to itself, and is combined, through the secretion of the vessels, with carbon and saline matter, from which it derives its nutritive properties, as well as with a large portion of ammonia, to which it owes the peculiar smell by which it is distinguished. The various species of urine from different animals differ in their constituents, and the urine of the same animals alters when any material change is made in the nature of the food.† The analysis of its composition has shown it to be most favorable to vegetation when mixed with other excrement, and with straw, or similar substances, because it occasions their combination, and contributes to their more perfect decomposition, by which they are converted into the species of manure of which we are treating; and although we confine that manure to straw, or haulm, and to the dung of horses and oxen, both as that of which it is the most generally composed, and as folding and night-soil will be separately considered, it yet includes every other kind of ordure.

Straw of all kinds, or similar dry vegetable matter, when used as litter, is well known to form a principal ingredient in the composition of farm-yard manure; not perhaps so much by the nourishment which it is of itself capable of imparting to the soil, as from the value which it acquires by its absorption of urine, as well as by combining with dung in its different stages of decomposition, and imparting consistence to the whole mass, which is then carried more regularly through the processes of fermentation and putrefaction, by which it is rendered fit for the purpose for which it is wanted. Nothing, in fact, can be better adapted for the mixture than straw; for it would rot with difficulty and imperfectly but for the dung, which brings an accession of the richest materials to the heap, and there can be no doubt that, when thus combined, it forms the best and the most generally useful of all manures, for every kind of land. All the various sorts of straw and haulm answer the purposes of litter, though opinions vary respecting its value for that use; some contending that rye straw is the best, while others insist, with more apparent reason, that the straw of wheat absorbs more moisture, and it is supposed to be equal to three times its weight after it has been saturated with urine.

It was the system of Bakewell, during a part of his life, to convert the whole of the straw into food for his stock, and it was also the opinion of many of his supporters that this mode of consuming straw would not only tend considerably to increase the number of black cattle, but also to improve the quality of manure; for they argued—'that straw is not alone thus rendered fit for the support of live-stock, but that, by being digested and passed through their bodies, it must become a much more highly enriched manure than in the ordinary way of treading and rotting.' Bakewell, however, altered his opinion at a later period of his life, and the doctrine is certainly questionable; for although it be true that a part of the straw, when eaten, assists the fermentation of the remainder, yet, when partly used as litter, it at once absorbs the urine, which is perhaps of more value, as manure, than straw which has been merely

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* Edition of 1823, p. 12.

† By experiments made by Mr. Brande on 100 parts of the urine of cows, and by Fourcroy and Vauquelin of horses, the following proportions were found in each, viz.:—

Cows.

Phosphate of lime	3
Muriates of potassa and ammonia	15
Sulphate of potassa	6
Carbonate of potassa and ammonia	4
Urea	4
Water	65

Horses.

Carbonate of lime	11
do. of soda	9
Benzoate of do.	24
Muriate of potassa	9
Urea	7
Water and mucilage	40

There is, therefore, more alkaline salts in the urine of horses, which consequently possesses greater fertilizing powers than that of oxen; and it has been not inaptly demanded, whether, if these ingredients could be procured cheap, and rendered soluble in water, they might not be so prepared as to become valuable for saturating dung-hills, or for application in its liquid state?—*Leicester Report*, note, p. 190. Human urine contains a greater variety of constituents than any other species, and differs in comparison according to the state of the body. All urine is liable to undergo putrefaction very suddenly; but that of carnivorous animals more rapidly than that of granivorous animals. The potash and pearl-ash of commerce are carbonates of *potassa*, of different degrees of purity.—*Sir H. Davy, Elem. of Agric. Chem.*, p. 256. *See also the Analysis, by Berzelius, and by W. Henry. M. D., F. R. S., Elem. of Exper. Chem.* 10th edit., vol. ii. chap. xiii. sect. v.

The white globe turnip not only yields a larger quantity of urine, but its effect as a manure upon any crop is less apparent than that of either the yellow Aberdeen or the Swedish. That produced by cut grass is comparatively weak; but the liquid manure from the refuse of distilleries, such as grains and dregs, has been found good.—*Quart. Jour. of Agric.*, No. xix p. 96.

masticated and digested, without being combined with richer food; and it is yet very doubtful whether, if all the straw in the kingdom were to be passed through the intestines of animals, the manure made from their dung would not be thereby reduced both in quality and quantity. The practice differs in various counties: in some parts of Yorkshire, and other places, a farmer commonly makes his cattle eat almost every particle of straw, leaving scarcely any to litter their stalls; while in Norfolk, they convert nearly the whole into muck, and no system is considered more impoverishing to land than that of applying the straw as food instead of treading it into dung.* The medium course is doubtless the most to be approved when it can be conveniently carried into effect; but there are many farms which either do not produce turnips, or only sufficient for their sheep, by which they are eaten off upon the land, and corn or oil-cake being too expensive for store and working stock, they must necessarily be chiefly kept upon straw. It is therefore profusely used for store-cattle in most yards, yet, by having abundance, they pick out the best and leave the refuse for litter: it is only necessary to supply it fresh, with a moderate quantity of turnips, or any succulent root, to promote the secretion of urine, and the manure thus produced will be found of excellent quality; but if they be wholly fed on straw, although the farmer may have a large dunghill, it will be found to be of comparatively little value.

It has been thought that cattle getting wholly straw, or other dry forage for both food and litter, may consume nearly three-fifths of it as food, and there would still remain a useful mixture of dung and straw for manure. When they are supplied, as young or keeping stock, with turnips to keep them merely in condition, the manure will be in good order when they eat about one-half of the straw, and leave the other half as litter. If again, they are being fattened on turnips, or fed on distiller's wash, grains, or upon other food, which produces their dung with much urine, they would then require to have at least three-fifths, if not a still larger quantity of straw left for litter. These proportions will, in such instances, be generally found to produce manure of a good description; but when beasts are fatting upon steamed potatoes and oil-cake, or other provender which occasions costiveness, or does not occasion a free discharge of urine, it may sometimes be necessary to moisten the dung-heap, by which means any quantity of straw may be rotted, and, with a comparatively small proportion of dung, may be converted into manure.† Mr. Marshall mentions having tried the effects of moisture in some experiments on his own farm upon heaps of dung which had lain until much of it had become mouldy, one of which he watered, bringing the outward and dry parts into the middle of the pile, and drenching it well with the drainage of the yard; it was then carefully turned over, breaking every lump and mixing all its parts, then finally wetting the surface, and clapping it smooth and close with the back of the shovel to keep it in the heat. It began to work on the second or third day, after which the mouldiness disappeared, and it was converted into comparatively rich, black, and rotten dung; and other similar trials were equally successful.* The utility of that point of management is, in fact, unquestionable: the trouble is not worth mentioning; but were it greater, and that any thing is to be thereby gained in the quality of the dung, that can form no sufficient excuse for its omission—for, if it be of any value, it cannot be too good, and the experience of kitchen gardeners, who are well known to use great care in the preparation of dung, and to profit accordingly, should operate as a hint to farmers to use similar means.

There can be no doubt that the *haulm of beans and peas* produces more nutritive food than straw. When the former is well broken by thrashing, it also forms a very tolerable litter, for which purpose it is much used in most parts of England, though in some places it is wholly laid, as if of no further value, in the bottom of the straw-yard, and pea-haulm is more generally employed in cart-stables for racking up the horses, and for sheep, which are very fond of it. In Scotland, however, the haulm of neither is used for litter, unless it has been spoiled by the weather, or has become sticky by the crop having been allowed to stand too long upon the ground before being cut, and it is there, more prudently, kept for the purposes of feeding.

When straw and haulm are scarce, many substitutes are used as litter, and the quality is but little regarded, because, being seldom employed except in cases of necessity, they do not admit of choice. It is, however, highly injudicious to mix vegetable substances that do not decompose equally, for when the straw in a mixen is fully digested and fit for the field, other articles may perhaps be still in a state of fermentation. Thus, in many places, *heath* serves the same purpose, and makes very good manure; but it is slow in decaying, and requires more than a twelve-month to go through the process of putrefaction. *Fern*, also, and many of the coarse aquatic plants which yield potash when reduced to cinders, possess very fertilizing qualities, and, when added to the dung-heap in a green state, they become speedily decomposed; but, when dried for litter, that operation is very tedious. It commonly takes more than a year before it is thoroughly concocted; it therefore retards the maturation of the straw, and either the one must be exhausted of its properties, or the other not in a fit state of decomposition when laid upon the land, if both are used in the same dung-heap; but separately, and when properly fermented, fern is as good as straw. The same remark applies to the *leaves of trees;* particularly to those of the oak, which contain an astringent property that renders them extremely difficult of decomposition, and if laid upon the land before they are brought into that state, they are found to be prejudicial to vegetation on light soils. They should, not therefore, be mixed up with straw, but formed into a compost by the addition of scourings of ditches, or any other soil, mixed with quicklime. Great caution should also be observed in making use of the sweepings of the barns, for they often contain the seeds of weeds, even after the dunghill has been reduced to putridity; it is therefore only prudent to use them separately with mould and a small

* Young's Survey of Norfolk, chap. xi. sect. 3.

†Quart. Journ. of Agric., vol. xi. note, p. 235

*Marshall's Rural Economy of the Midland Counties, vol. ii pp. 95, 120 quantity of quicklime, which should, however, be cautiously applied, as lime has the effect of decomposing vegetable matter so promptly as to materially lessen its bulk.

[To be Continued.]

Extract from an address delivered by A. Stewart, at Oswego.

WAR VERSUS RAIL ROADS, COMPARED AS SUBJECTS FOR NATIONAL EXPENDITURES.

What has been done on the subject of rail roads and canals in New York, Pensylvania, and Ohio, in the last seventeen years, will exceed all that has been done by Europe from the morning of time. The sister states will be laid under lasting obligation to New York, for her great example in the work of internal improvements, which has given new impulse to the affairs of mankind.

What better could New York do with the vastness of her resources, than judiciously expend 100 millions of dollars in rail roads and canals? Every dollar would be quadrupled, in private and public benefit.

The world has been exhausted by all her resources, hitherto, in *war* and *architecture*. The war-wasted resources of the world, would have made every inch of land a garden, from the regions of eternal ice to the burning line.

Our late patriotic war cost us one hundred and thirty millions of money, which would have made us ten thousand miles of rail road and canal. Had this one hundred and thirty millions been so appropriated, it would have left my country ahead of the world.

Look at the waste of public money and human labor, in the useless architecture of the pyramids, those "piles of wonder," and "sleeping places of death," mere pride and ostentation! The proud monarchs by whom built, their names have perished from the records of human remembrance; the same labor and money would have united the Nile and Red Sea, the Persian Gulf; and saved the long and dangerous navigation around the Cape of Good Hope.

Look at the Languedoc Canal—the only monument likely to rescue the memory of Louis 14th from oblivion; but what was this expenditure compared with the waste of money on building the palaces, and making the wild hills of rocks, and fictitious lake at Versailles?—amounting to the enormous sum of four hundred millions of dollars —a sum sufficient to have brought a rail road and canal to the gate of every city and village in France, and left a direct communication between such city and village, and the Mediterranean and Atlantic. These same palaces at Versailles are now a frightful solitude; nothing is seen but an old decayed officer hobbling over the piles of sculpture and through empty palaces, to show the stranger and travellers those vacant abodes of the departed enemies of man.

The energies of the Grecian and Roman nations were squandered upon those expensive erections of marble which inflamed pride and ambition, without benefiting the commerce of those nations. What would have made ten miles of canal, was expended on the *polish* of the columns of a heathen temple.

Look at modern Europe, covered with abbeys, castles, and the nonsense of kings, by which the power of the nation has been wasted in the pride of architecture.

The money spent on any one of the thousand wars of Europe would have connected the Indian ocean with the Mediterranean, and the Pacific with the Atlantic by the Isthmus of Darien; and the too often disastrous navigation around Cape Horn and that of Good Hope might have been avoided, and the navigation of the globe shortened one-half.

UNPRODUCTIVENESS OF THE SKINLESS OAT.

[The anxiety expressed by many of our correspondents to obtain seed of the skinless oats, induced us to write to Messrs. Prince for a parcel, which was designed to be distributed gratuitously. We give below an extract from their answer, which furnishes a very different opinion from that generally held of this much praised grain. There can be no better authority on such a subject than Messrs. Prince—and this may be taken as one, added to the numerous previous examples of new products, being cried up as wonders, and soon after universally admitted to be not worth culture.]

To the Editor of the Farmers' Register.

The skinless oat, so far as the results of its culture have been known to us, is the least productive of all the varieties. The quantity of straw, however, is very great—and the abundant vegetation causes the cultivator to expect an immense crop previous to his harvesting it. Either by deterioration, by admixture of the pollen of other varieties growing adjacent, or from some other cause, there is usually a considerable portion of the crop that is not skinless. Possibly this may arise from the seed sown not having been pure. Certain it is, however, that if the admixture is but in a small proportion when sown, it will far exceed in ratio when harvested. We have not time to add more than this. We have the seed for sale, but we advise no person to sow it for profit.

Yours very respectfully,

WM. PRINCE & SONS.

Linnæan Botanic Garden, Flushing, Dec. 21, 1835.

PROCEEDINGS OF AGRICULTURAL SOCIETIES.

[We regret that the following proceedings should have reached us too late for the last No.—and indeed for the extract from the Albemarle transactions, we were at last indebted to a source not official, and as late as Dec. 25th. It is desirable, with regard to such proceedings as are designed for this journal, that they should be sent in as early as possible. In this case, the delay of the report on the Agricultural Convention, (by the committee of the Albemarle Society,) is a subject of especial regret—and the more so because, in no publication did it come under our observation before this copy was received.]

Fredericksburg, Nov. 23, 1835.

SIR—Enclosed you will find an abstract of the proceedings of the Fredericksburg Agricultural Society, which I send by the request of the society for publication in the Register. Your compliance will oblige.

Very respectfully, your ob'dt serv't,

R. B. SEMPLE,

Sec. and Treas. Fred. Ag. Society.

AGRICULTURAL SOCIETY OF FREDERICKSBURG.

Annual Meeting, Nov. 12.

The Society was called to order by the late Secretary, when on motion, the rule requiring the election of officers by ballot was suspended, and the Society proceeded to the election of their officers for the ensuing year, whereupon the following named gentlemen were unanimously elected:

JAMES M. GARNETT, *President,*
GEORGE HAMILTON, *1st V. President,*
FRANCIS W. TALIAFERRO, *2d V. P.,*
ROBT. B. SEMPLE, *Sec'ry. & Treasurer.*

Mrs. L. M. Taliaferro, of King George, having signified to this Society her desire to become a member, it was unanimously resolved that she be admitted.

Evening Session.

George Hamilton, 1st Vice President, in the chair, when the several committees made their reports.

The Committee on mares, colts, fillies and riding horses, beg leave to report that there were several fine mares exhibited, and some difficulty presented itself, in making our selection; however, we have declared our opinion in favor of a sorrel mare, the property of John H. Lee, Esq.

The same difficulties presented themselves on the subject of the colts and fillies. Nevertheless, we have come to the conclusion that the finest is a sorrel colt, the property of Dr. Grayson.

A number of fine riding horses were exhibited, and the committee are of opinion that a roan horse, the property of Charles Tayloe, Esq., is entitled to the premium. All of which they beg leave most respectfully to submit.

JAMES RICHARDS.

The committee for stallions and jacks report that there were two horses exhibited for the premium "for the best thorough bred stallion," viz: James Lunsford's young Truffle, and Jeremiah Wilson's Gray Janus; that the pedigree presented to them as that of Gray Janus, being so defective that they cannot regard him as a thorough-bred horse, and there being, therefore, no competition for this premium, the committee have *resolved unanimously* to recommend that no premium be awarded for the best thorough-bred stallion.

The committee further report, that for the premium offered for the best stallion without regard to blood, were entered, Booker Waller's Pretender, and Gabriel Long's Young Janus, and that they award the premium to Pretender, a large heavy horse well calculated for the get of wagon horses.

The committee further report that three jacks were entered for the premium for the best jack, viz: W. A. G. D. Ashton's Don Juan, Thomas Rowe's Black Hawk, and Jeremiah Wilson's Jack, and that they award the premium to Mr. Rowe's Black Hawk—this jack being of superior size and figure.

FRANCIS W. TALIAFERRO,
EDW. T. TAYLOE.

The Committee on beef, sheep and mutton beg leave to report, that they have examined the fatted work-oxen, and do award the premium to J. S. Wellford, of Fredericksburg.

And to John S. Wellford, for the best grass fed beef.

And to John F. Taliaferro, of Orange, for the best mutton, grass-fatted.

A fine ram and ewe were exhibited by Mr. John Gray, of Stafford, but as there were no other ram or ewe exhibited, the committee decline awarding a premium, and refer it to the Society to decide whether they will award Mr. Gray a premium or not.

GEORGE ROWE.

Upon inquiry made by the society, and report furnished by the committee, that the sheep exhibited by Mr. Gray were extraordinarily fine; it was unanimously resolved that Mr. Gray be awarded the premium for the best sheep exhibited.

The committee appointed to examine and report upon the best bull and best milch cow, report that they award the premium for the best milch cow, taking into view pedigree, &c. to Edward T. Tayloe, and they further report, that there were but two bulls offered—one of them being without pedigree, the other, though with pedigree of the improved breed, we think not deserving of a premium.

GEORGE HAMILTON.

An essay on the horse was read by Francis W. Taliaferro.

Friday, Nov. 13th—2d day.

The Society met pursuant to adjournment, the president in the chair.

On motion of John Dickinson:

Resolved, That a premium of ten dollars be offered to any member of this society who shall exhibit satisfactory proof of the greatest nett profit made in the same year from one acre of land, cultivated in some crop suitable for a staple, within the range of residence of the members of this society.

The society adjourned to attend the exhibition of domestic manufactures, &c., and to hear the president's annual address, which was delivered by request of the society, at the Town Hall, and to meet again half past 3 o'clock.

Evening Session.

Pursuant to appointment the society met, the president in the chair.

The committee on domestic manufactures report that they award $5 to Miss Achison, for carpet—that the 2d is unworthy of a premium.—1st counterpane, wool and cotton mixed, Miss Achison, $3—2d do. Wm. I. C. Rothrock, $2—1st counterpane, cotton—Proctor, $3—2d do. Wm. I. C. Rothrock, $2—1 pair wool stockings, Miss Hill, $1—2d do. Miss Benson, $1—1 other material, Miss Berryman, $1—1 piece flannel, Miss Hill, $5—negro clothing, none worthy: discretionary, deemed worthy Mrs. Gordon's rug, $5—Mrs. Skinker's plaid, $2—Duerson's cassinett, $1—Miss Fitzhugh's straw bonnet, $1—Miss Richards' tippet, $5.

The Committee on butter, award the premium to Miss M. E. Mitchell, of Spottsylvania, for the best 10 lbs. of Butter.

WM. JACKSON.

The Committee on Agricultural Implements report that they have examined two articles exhibited by Mr. James M. Garnett, one an expanding harrow, for which they award ten dollars.

The other an Echellon cast hoed Cultivator, fixed in a wooden brake, being original in several respects, and promising utility for cultivating corn, or seeding wheat, they award to him $5 for the same.

YEAMANS SMITH.

Upon motion of Major James Richards, and sustained by Mr. John Dickinson, it was unanimously

Resolved, That the premium on the expanding harrow, be increased to twenty dollars—and the one on the cast hoed cultivator, be increased to ten dollars, and that the thanks of this society be tendered to Mr. Garnett for the great improvement made upon these important implements of husbandry.

On motion of Mr. Dickinson:

Resolved, That the report of the committee on agricultural implements be forwarded to the Editors of the Arena, Herald, and Farmers' Register, with the request of the society, that they be published in their respective journals.

PROCEEDINGS OF THE AGRICULTURAL SOCIETY OF ALBEMARLE.

Premiums awarded at the 11th Annual Exhibition.

Horses.

To James Ross, for the stallion by Truffle, out of Lady Teazle, best calculated to improve the breed of horses,	$10
To Wm. Garth, for the best brood mare,	8
To Seth Burnley, for his mare, by Sergeant's Medley, calculated for agricultural purposes,	6
To Bez'l Brown, for his three year old colt, Bonnets O'Gray, by Gray Beard,	6
To Clifton Brown, for his three year old colt, Black Beard, by Gray Beard, out of a full blooded Potomac mare, the second premium of	4
To William Garth, the second premium for the best two year old colt,	3
To John Rodes, for the best year old colt, (by Byron,)	3
To J. P. Sampson, for the best do. by Wild Fire,	2

Cattle.

To John Winn, for the best bull,	$8
To John H. Craven, for the second best do. two years old,	5
To John N. C. Stockton, for the best cow,	5
To John Winn, for the second best do.	4
To Wm. Woods, for the best heifer, one year old.	5
To John Winn, for the second best do. two years old,	3

Sheep.

To William Woods, for the best ram,	6
To J. H. Craven, for the second best do.	5
To John Winn, for the best pen of ewes,	5
To J. H. Craven, for the second best do.	4

Domestic manufactures.

To Mrs. Clark, for the best piece of wool and cotton flannel,	3
To Mrs. Craven, for the second best do.	2
To Mrs. Dabney, for the best carpet,	6
To Mrs. Walter Coles, for the second best do.	5
To Miss Lucy Ann Simms, for the best hearth rug,	2
To Mrs. Mary Brown, the second premium for blankets	3
To Mrs. Winn, for the best negroes' winter clothing,	5
To Mrs. Sarah Bowcock, for the second best do.	4
To Miss Dabney, for the best pair of woollen hose,	1

The exhibition of suits of clothes, was decidedly better than those heretofore shown.

The Judges award to John Rodes, the first premium of	$6
To John H. Craven, the second do. of	5
And to Wm. Woods, the third do. of	4

The Judges award to Mrs. Jane C. Woods, the first premium for the best cotton counterpane, 3

To Mrs. Simms, for the best piece of hempen or flax shirting for negroes,	4
To Mrs. Mary Brown, for the best piece of flax diaper,	4
To Mrs. F. Rodes, for the best piece of flax and cotton diaper,	3
To Mrs. Jane C. Woods, for the best pair of thread hose,	1
To Miss H. Gatewood, for the best pair of cotton hose,	1

Agricultural products.

To John Carter, the first premium for wine, made of the Catawba grape,	4
To James Clark, the second premium for wine, made of the common wild mountain grape,	3
To John H. Craven, for the best barrel of cider,	4

Cheese and butter.

To Mrs. Wm. Woods, for the best cheese,	3
To Mrs. J. N. C. Stockton, for the best butter,	3

To Mrs. Jane Randolph, for the second best do. 2

The Committee think it proper to add in relation to the award of the premiums for butter, that other ladies exhibited very excellent specimens of that article, highly creditable to their domestic economy and skill, between which and those to which the premiums were awarded, they had some difficulty in deciding.

The Committee of the Agricultural Society of Albemarle, on the subject of an agricultural convention, report the following preamble and resolutions for the consideration of the society.

Other classes congregating in towns and cities for the purpose of pursuing their employments with more advantage, easily unite on any subject involving their common interest: whilst agriculturists, residing in separate habitations—scattered through the country for the pursuit of individual interest, are with difficulty brought together, for consultation on the general good. To this circumstance no doubt may be attributed the fact, that in ancient times liberty and a republican form of government were confined to cities. The moderns, by the introduction of representation, have not only obviated this difficulty, but from the superior virtue of the tillers of the earth, given to liberty an extent and stability heretofore unknown.

This principle of delegated authority has been not only adopted in matters of government, but it is now every day's practice for those interested in any subject to depute some of their members to meet others similarly situated, to consult for the good of their class, and devise and recommend measures for their adoption.

Agriculture should certainly avail herself of this improvement to keep pace with the progress of society; and to make such regulations as may favor the general communication of knowledge and the acquisition of improvements from abroad, in the vegetable and animal kingdoms.

But perhaps the most important subject that could attract the attention of such a meeting, would be the suggesting and soliciting such legislation as the interests of tillage and husbandry require. It may be objected to this that our legislature being elected by the body of the people, a majority of whom are farmers would have the interests of their constituents at heart. Truly, they all wish to serve their constituents—but unfortunately so many are lawyers and politicians, looking forward to ulterior promotion, that but few know what the real interests of agriculture require. As evidence of this, witness the number of petitions sent in every year on the subject of enclosures, inspections, roads, &c. on which they fail to legislate at all, or do so in so bungling a manner as to increase the evil they meant to remedy. One great error of this legislation on local petitions is that they only hear one side and see one view of the question: whereas a convention of farmers from all parts of the state would see that the interests of none was sacrificed.

Amongst the numerous subjects which would command the attention of such a body, would probably be the establishment of a professorship of agriculture. It seems peculiarly hard that those who have mainly contributed to establish and support the best literary and scientific institution in the country, should be themselves excluded from its walls. And one of the great misfortunes is, that a large portion of the lands of the state fall into the hands of young men, entirely unacquainted with their management; which is not the case in other employments—for there must be evidence of knowledge in his profession before the lawyer can get a brief—the physician a patient—or even the blacksmith a horse to shoe: whilst the young heir comes to the possession of lands and negroes whether qualified or not.

Resolved, That the Agricultural Society of Albemarle proposes to all the other agricultural societies and counties in the state of Virginia, to send delegates to a convention to be held in the city of Richmond, on the second Monday of January next, to consult upon, devise and recommend such measures as they may deem proper for the promotion of the interests of agriculture.

Resolved, That this society elect five delegates to unite with such others as may meet for the purpose of forming said convention.

Resolved, That copies of the foregoing preamble and resolutions be furnished to the Virginia Advocate, Jeffersonian Republican and Farmers' Register for publication, and that they and all other papers in the state are requested to insert the same.

W. H. MERIWETHER, *Chairman.*

PROCEEDINGS OF THE FLORIDA AGRICULTURAL SOCIETY.

1. At an adjourned meeting of this institution, held at the Capitol, in the city of Tallahassee on the 11th instant.

2. Achille Murat, Esq., the chairman *pro tem* having made known to the society the recent death of their late acting secretary, Oscar White, Esq., Farquhar Macrae, Esq., nominated Edward Chandler as a proper person to act as secretary of this society at its present meeting; who having assented thereto, was accordingly appointed.

3. On motion of F. Macrae, it was

Resolved, That the "Florida Agricultural Society" deeply regret the death of their late acting secretary, Oscar White, deceased.

4. *Resolved*, That sympathising in the afflictions of his bereaved widow and other relatives, the society respectfully tender them their condolence.

5. *Resolved*, That this tribute of respect to the memory of our lamented secretary, be communicated through the secretary to his relatives, and be published in the Floridian.

6. Mr. Macrae, chairman of the committee of direction, appointed at the last meeting to draft a constitution for this society, reported a constitution to this meeting, which, with some amendment, was unanimously adopted.

7. On motion of the same gentleman, seconded by the Hon. Thomas Randall, the society then proceeded to elect its officers by ballot, and on counting the votes, the following named gentlemen were found to have been elected, viz:

1. John Parkhill, President of the Society.
2. Farquhar Macrae, Corresponding Secretary.
3. Edward Chandler, Recording Secretary.
4. Richard C. Parish, Treasurer.

On motion of Judge Randall, the election of

Vice Presidents and Directors for the several counties, was then gone into, and the result was as follows:

FOR LEON COUNTY.

Vice President.—Hector W. Braden.
Directors.—Augustus Alston and Ben. Chaires.

FOR JEFFERSON COUNTY.

Vice President.—Thomas Randall.
Directors.—Achille Murat and E. B. Vass.

FOR GADSDEN COUNTY.

Vice President.—Charles M. Du Pont.
Directors.—Joseph McBride and Henry Gee.

FOR MADISON COUNTY.

Vice President.—James B. Mays.
Directors.—John McGehee and John Miller.

FOR HAMILTON COUNTY.

Vice President.—Appleton Rossetor.
Directors.—James Bell and Joseph Law.

On motion, it was Resolved, That the secretary be, and he is hereby requested to cause these proceedings to be published in the Floridian.

The society then adjourned till the second Wednesday in December next, to convene at the same place at the hour of eleven o'clock.

EDWARD CHANDLER, Sec'ry.

NEW ARTIFICIAL MANURES—OFFAL OF SUGAR REFINERIES, AND ANIMALIZED CHARCOAL.

Translated from the *Annales de l'Agriculture Française* for the Farmers' Register.

[The two following articles, serve to give information on discoveries which are deemed of much importance in France, but have scarcely been heard of even by their neighbors in England, and still less in America. We published an article (p. 120 vol. 3,) from a British agricultural journal, which served to show a remarkable degree of existing ignorance as to the nature of these manures, while it also furnished evidence of the high estimation in which they are held on the continent. Though we had then met with frequent references to these manures, in recent French publications, there was nothing plain enough to be at all satisfactory, until we obtained the earlier Nos. of the *Annales*, from two of which for 1833, the following pieces are drawn.

The very rich manure furnished by the sugar works must necessarily be in small quantity, though to that limited extent, the substance is a matter of much value, and should be put to proper use. We know not whether this product of the sugar works of this country has been used, or is wasted like most of the other rich manures of our towns and factories. In France, the demand soon directed the attention of chemists to the fabrication of a substitute. The remains of the sugar works, were principally blood and charcoal, chemically combined. It occurred to Mr. Payen that any other kind of charcoal combined with any other animal matter, might furnish analogous substances, approaching in value to the remains of the sugar works. Hence his investigations, and the results stated below.

But the most valuable part of this fabrication of manure, is the effect of the carbonaceous matter in combining with putrefying and wasting substances, stopping the escape of the offensive and injurious effects of the effluvia, and preserving all, for the future fertilization of the earth. This is a great and important discovery—and we should rejoice to see it applied to use in this country, for the purposes of improving the cleanliness and health of towns, as well as to fertilize the surrounding farms. But it should be remembered that effects very similar, if not equal, may be much more cheaply obtained, by using mild calcareous earth to combine with, and secure from waste and from doing injury, all putrescent animal matters. Carbonate of lime as certainly combines chemically with decomposing animal substances, as it seems that charcoal does. The two compounds are, of course, substances of very different kinds and properties—but they agree in this, that the animal matter is equally well saved. The difference of value as manure, will depend on whether the charcoal in the one compound, or the calcareous ingredient of the other, is of most service.* We hope that some intelligent and spirited "town farmers" will attend to both these manures, for agricultural profit and improvement—and that even city councils may at some remote future time be persuaded to use these means to convert the filth of the cities to a true and important source of profit.]

Offal remains of sugar refineries.

The *Journal d'Agriculture des Pays-Bas* (of January 1831,) contains the detail of what experience has already made known upon the strength of the manure obtained from sugar works. This paper [the Gazette of Rural Economy, published in Hesse,] had given information of its use, in 1829. * * * *

These remains, besides the coarse part, contain a kind of mucilage, the blood used for clarification, parts of sugar not divided, and many other matters detached from the raw sugar. It is perhaps the most powerful manure that is known. Its effect is so great, that it is very necessary to consult the nature of the soil, and other circumstances, so as not to apply too much, or too little. The quantity varies from three to six hectolitres to the hectare, [or nearly the same number of bushels to the acre.]

The most admirable effect of this manure is observed in clayey, moist and cold land: it cannot be used but with precaution, and in less quantity, on dry and light soils.

The remains of sugar may be mingled with other manure—for example, with rotten farm-yard manure and mould, the mud of ponds, peat, &c. To draw the greatest profit from this manure, it ought not always to be used alone, but alternately with dung, especiallly with that of large cattle. In this manner, a poor country may be carried to a growing state of prosperity.

Some heath lands had been too hastily condemned as not susceptible of culture; broken up eight years ago, they have borne crops since without respite. They have been manured four times,

*See Essay on Calcareous Manures, 2nd Ed. ch. xix, and Note N. of Appendix.

in this time, to wit, twice with farm-yard dung, and twice with the remains of sugar, at the rate of four hectolitres to the hectare. This land now yields a high rent.

The effect of the remains of sugar does not last but two years; and there are soils on which it scarcely acts as long as the second year—but then it is strengthened by a half manuring from the farm-yard, and again will produce heavy harvests of corn, or other exhausting crops. The remains of sugar is the manure to be preferred for all cabbage-turnips, &c. It produces a very good effect upon cold and moist meadows; but it must not be spread there until spring, after they have been made dry.

The refineries of Belgium, Holland, the north of Germany, and even of Russia, send their remains, in great quantity, to Nantes, where they find a suitable *depot*. They are in much demand, sell at high prices, and their use is still extending upon the banks of the Loire, and even in the interior of La Vendee.

Animalized charcoal [*noir animalisé.*]

The following article in relation to the precious discovery of Messieurs, Salmon and Payen, is communicated to us by one of the men of science whom France most honors.

It is seldom that the world entertains a just idea of the discoveries which daily enrich the physical and chemical sciences. It is generally considered that a fact, of which there is no immediate application to the arts, ought to be put away among the archives of science, where adepts alone will go to search for it. But however little we may carry back our recollections to time past, a crowd of examples will naturally present themselves to correct ideas, and to replace such new facts in their proper rank. When we see that the discovery of the new world is due to the simple observation of the direction that a magnetized needle takes, when freely suspended on a pivot—and that the art of war is totally changed by the use of gunpowder, of which the discovery long preceded its application—we must be convinced that no new observation, however of little interest it may appear at first, ought to be neglected—for, soon or late, there may result from it useful applications. The benefit that has been derived latterly, from certain long known physical properties of charcoal, to form excellent manure, and to disinfect larger masses of organic and putrefying substances, comes to the support of the considerations which we have presented.

All substances are called *manures*, which when applied to the earth, serve for the nutrition of vegetables.* Manures are composed usually, of carbon in various states, of azotic matters, and of salts which act often upon plants as stimulants. In general, all organic matters are manures, more or less good, according to their nature, and according to the greater or less facility with which they yield their constituent parts to vegetation. We distinguish three kinds of manures, which have each their characteristic properties. These are—animal manures, composed of animal remains—vegetable manures, the name of which indicates their composition—and mixed manures, formed of any proportions of both the preceding mingled together. The first kind, without dispute, is that which most promotes the developement of vegetation. Also, if we seek the means of presenting animal matter in the most proper state, they will be found in retarding as much as possible the quick decomposition which would naturally take place.

We shall occupy ourselves, only, in this article, with the manure known in agriculture, for some years, under the name of animalized charcoal. Before making known its composition, and the advantages which may be derived from it, we will recall certain physical properties, which different charcoals, and all porous substances in general, possess: the reader will then the better understand the procedure in use, the patent invention [*breveté*] for preparing animalized charcoal. Charcoal possesses two very remarkable qualities, from which the arts have derived great benefit. It precipitates divers substances from a state of solution, by combining with them—and it absorbs in its pores considerable quantities of all the gases. To acquire for it the precipitating property, it is necessary that the charcoal should be burnt in close vessels. The kind which acts with most efficacy, is that which is obtained from animal matters, such as dried blood, hair, bones, &c. calcined with a chemical action proper to prepare the substances to be very minutely divided, when mechanical means are applied for that purpose. Charcoal thus prepared acts only on substances of organic origin, particularly upon such as are colored and odorous. It serves, as is known, to take away the color from red wines, and sirops, and to remove the fetid odor of bodies in a state of putrefaction, to render corrupted water potable, and to preserve fresh water at sea, by keeping it in casks charred on the insides. They also use, with success, pulverized charcoal to preserve animal substances for many months, in close vessels.

Messieurs. Burry and Payen have found that all organized bodies of animal origin do nor furnish charcoals possessing the same degree of precipitating power. The charcoal (or black) of ivory is that which has this power in the lowest degree, while the charcoal of blood is that which occupies the first rank, if its state of division is brought to the useful point.

The property of absorbing and condensing gases belongs not only to charcoal of animal origin, but also to that of wood; and in general, of all porous bodies: but for that end, it is necessary that these bodies should have been in the first place deprived of humidity.

We know not yet what is precisely the action of charcoal on vegetation, whether as alimentary manure [*engrais*] or an improver of soil [*amendement.*] Rumford has proved, it is true, that it can unite with oxygen, and form carbonic acid below the temperature at which the combustion of this substance commences visibly; and this fact would tend to explain why the spots in forests, where charcoal has been made, become fertile in after time. As an improver of soil, this substance has

*The reader of the translation of the *Essay on Lime*, may remember what was stated of the difference of meaning in the term *manure*, as used in French, and in English. (See Note, p. 360 vol. 3.) Ed. Farm. Reg.

properties which cannot be doubted, proceeding from its precipitating and absorbing action. In general, the matters which contain carbon in a state of minute division, are those which most favor the nutrition of plants, because they are most easily changed into carbonic acid, which is dissolved in water and absorbed by the plants.

M. Payen has applied himself to interesting researches upon the use of animal charcoal. This scientific manufacturer has proved that it was to be preferred, in refining sugar, to vegetable charcoal. He had to contend, for a long time, with the prejudices to which custom had given birth; but when he had well established the superiority of the first over the other, the refiners of the great manufacturing cities came to Paris to provide themselves with carbonized animal matters. This was for him a motive to connect himself with Messieurs. Salmon and Lupé, in order to devote their labors to this kind of fabrication. Before the formation of this establishment, M. Payen had studied with care the properties of animal charcoal, and had proved that the discoloring power depended on the state of division of both substances; that the carbon only of the various charcoals acted upon the coloring matters, by uniting with and precipitating them, and that in the refining of sugar, the action of the animal charcoal was carried equally upon the extractive matters; and that the remains of the refineries of sugar greatly favored the developement of vegetation.

We will now proceed to the formation and to the properties of animalized charcoal. There have been made a great number of trials to apply, in the most suitable and useful manner to vegetation, the remains of animal matters, which by reason of their constituent parts, act with most energy in aiding the developement of plants: but among all the men of science, or manufacturers who have attended to this subject, we ought to distinguish Messieurs Salmon, Payen, and Lupé, who have formed, in the plain of Grenelle, an establishment of this kind, which deserves to be encouraged.

It has been known, for some time, that the dregs or offal remains of the refinery of sugar, composed of animal charcoal, blood, and the extractive or impure parts of the raw sugar, formed an excellent manure.

M. Payen has sought means for bringing into use the bodies of dead animals. In a memoir (for which a prize was awarded by the Society of Agriculture in 1829,) he has demonstrated, by numerous facts, that the greatest possible benefit may be drawn from manures not rotted, and from the remains of animals not putrefied. He has at the same time made known the favorable influence of a fermentation retarded, and proportioned to the developement of vegetation. In this interesting memoir, the author has already indicated as one of the means the most fit to reach the end which he proposed, the absorption of soft organic matters, containing azote, (as the blood, the fecal matter, intestines, brains, &c.,) by earths dried in a furnace. This important result was the first step to make, to offer to plants animal matters not yet decomposed, in a very minute state of division.

In 1831, M. Salmon, an enlightened manufacturer, succeeded in uniting in one economical fabrication all the useful conditions which can be offered by a porous, absorbent, carbonaceous powder, charged as much as possible with organic animal matters. The immense advantage to agriculture to be derived from such a manure, may be imagined. M. Payen, hastened to unite his efforts to those of Messieurs. Salmon and Lupé, to accelerate the developements of a branch of industry which was to have a great influence on agriculture. The trials which have been made in various places with this manure, have served to confirm the previously formed opinions of its efficacy. Animalized charcoal, by reason of its mild and gradual action, may be placed in contact not only with seeds, but also with the herbaceous stems, and the roots of plants; which cannot be done with many other rich manures, as night soil [*poudrette*,] urine, &c.

It has been remarked in practice, that animalized charcoal has less activity in forcing the first developement of stems and leaves than some other manures; but that its action favored fructification much better. Messieurs Briaune and Bella, at Grignon, have observed, that compared with night soil, the product in grain of an equal space manured with animalized charcoal, was one-fifth at least more considerable. This fact has been observed equally in the culture of other cereal plants, and of rape, hemp, flax, clover, beets, turnips, &c. It has also been ascertained that grass or fodder crops at the time of mowing, presented an equal increase of product, although sometimes the early movements of vegetation may have been less rapid. Sown upon meadows, artificial and natural, upon grass sod, and upon corn at three or four inches high, animalized charcoal soon produced a deeper shade of green, and a sustained activity of vegetation. We are equally assured that in gardens, culinary vegetables, manured with four or five times as much animalized charcoal as in field culture, acquire gradually considerable dimensions.

Such are the benefits to be derived, in regard to agriculture, from the use of the carbonaceous animalized powder: but its preparation may be also of immense advantage for the salubrity of cities; we do not fear to call the attention of persons charged with their government, to this subject. The contents of privies and sewers, the infected mire, the remains of dead animals, are commonly carried to but a small distance from cities, where they serve to infect the neighborhood. Sometimes their complete decomposition does not arrive until at the end of some years; while if they were submitted immediately to the action of the pulverized coally matters, which are fabricated in the establishment of Messieurs Payen, Salmon and Company, the disinfection is instantaneous, and an excellent manure is immediately obtained. We have witnessed that entrails in a state of putrefaction, which spread a most offensive odor, have been converted immediately to manure having no odor. This establishment prepares a sufficient quantity of this charcoal to convert to manure a large part of the filth of Paris. We earnestly hope, both for the interests of agriculture and of humanity, that similar establishments may rise around all our great cities, to make disappear those hotbeds of infection, which often bear death and desolation in the midst a numerous population.

B******

Extracts from Governor McDuffie's Message to the Legislature of South Carolina.

PROTECTING DUTIES—SLAVERY—ABOLITION.

The magnitude of the burthen imposed upon the states which produce the great staples of exportation, by that compound scheme of taxation and prohibition, artfully denominated the protecting system, may now be estimated, in some sort, by the high state of agricultural and commercial prosperity which has followed the late adjustment of the federal tariff. By that measure of compromise, the duties upon many articles which we import from the manufacturing nations of Europe, were entirely repealed, upon others greatly and immediately reduced, and upon the entire class of protected articles a gradual and progressive reduction was provided, until they shall reach 20 per cent. in the year 1842, and after that the lowest rate that will furnish a revenue sufficient for the wants of the federal government, upon an economical scale of administration. Such are briefly the terms of that covenant of peace, which restored for a time the long lost harmony of the confederacy, and to which the faith of the contracting parties is solemnly pledged. And although it came short of conceding all that we had a strict right to demand, the benefits we have derived from it are great and manifest.

Every impost upon foreign merchandzie operates both as a tax, and as a restriction upon commerce. However, in this two-fold aspect of the subject, we may distribute the burthen of the tax, the burthen of the restriction falls exclusively upon the exports which constitute the exchanges of commerce. Hence the unjust and unequal operation of prohibitive duties on the exporting States, and hence, in a great degree, the enhancement of the price of their great agricultural staple, since the reduction of the duties. The degree in which this measure has contributed to produce that enhancement, will be made manifest by reference to a few statistical facts disclosed by the official statements of our foreign commerce, by the secretary of the federal treasury.

During the fiscal year ending the 30th of September, 1834, the importation of merchandize exempted from duty, amounted to the enormous sum of sixty-eight millions of dollars; fifty millions more than in any year previous to the recent enlargements of the list of free articles, and nineteen millions more than the whole amount of cotton exported from this country during the same year. Of this unexampled amount, about thirty millions came from the manufacturing nations of Europe, which consume our cotton, thus furnishing the means of a direct, untaxed and profitable exchange for our invaluable staple, equal to nearly two-thirds of the estimated value of the whole export of that staple. If to this we add six millions for the import of teas from China, which are now to a great extent virtually exchanged for our cotton, by means of an intermediate exchange for British manufactures suitable to the China market, the cause will be at once explained, of that sudden and seemingly unaccountable increase of the foreign demand for our cotton, which has exerted so propitious an influence upon its price, and by consequence upon the prosperity of the southern states. The extent of the demand for our raw cotton by the manufacturing nations of Europe, is limited only by that of our demand for their manufactures; and how much this has been increased by the recent adjustment of the duties upon foreign imports, is clearly shown by reference to authentic documents. It is in this view of the subject, that duties upon foreign imports impair the value of domestic exports, and that the repeal or reduction of those duties produces a corresponding enhancement of that value.

A free and unrestricted exchange of our agricultural staples for such foreign productions as we require for consumption in the United States, is the essential basis of the prosperity of the staple-growing portion of this confederacy; and whether these foreign productions consist of such articles as are manufactured in this country or not, is a less important consideration, than that they come from the countries that consume our staples, or from others in exchange for those staples. This was the basis of the late compromise with the federal government, in which the southern states consented that the duties on the class of protected articles should be gradually and progressively reduced to the revenue standard, on condition that they should be forthwith repealed or reduced to a nominal rate, on other articles, furnishing a beneficial foreign exchange for our exports. And I confidently trust that in the liberal spirit and with the liberal principle of this compromise, when the congress of eighteen hundred and forty-two shall come to perform the delicate and responsible duty of reducing the tariff of federal duties to such a revenue scale as will barely supply the funds requisite for an economical administration of the federal government, it will be found practicable so to reduce and arrange the duties, as to relieve the planting states to a much greater extent, without materially affecting the interests of the manufacturing states, and at the same time to withdraw from the vaults of the federal treasury, that prolific source of corruption, a large surplus revenue.

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Since your last adjournment, the public mind, throughout the slave-holding states, has been intensely, indignantly, and justly excited, by the wanton, officious and incendiary proceedings of certain societies and persons, in some of the non-slave-holding states, who have been actively employed in attempting to circulate among us, pamphlets, papers and pictorial representations of the most offensive and inflammatory character, and eminently calculated to seduce our slaves from their fidelity, and excite them to insurrection and massacre. These wicked monsters and deluded fanatics, overlooking the numerous objects in their own vicinity who have a moral, if not a legal claim upon their charitable regard, run abroad, in the expansion of their hypocritical benevolence, muffled up in the saintly mantle of christian meekness, to fulfil the fiend-like errand of mingling the blood of the master and the slave, to whose fate they are equally indifferent, with the smouldering ruins of our peaceful dwellings. No principle of human action so utterly baffles all human calculation, as that species of fanatical enthusiasm, which is made up of envy and ambition, assuming the guise of religious zeal, and acting upon the known prejudices, religious or political, of an ignorant multitude. Under the influence of this species of voluntary madness, nothing is sacred that stands in the way of its purposes. Like all other religious impostures, it has power to consecrate every act, however atrocious, and every person, however covered over with "multiplying villainies," that may promote its diabolical ends, or worship at its infernal altars. By its unholy creed, murder itself becomes a labor of love and charity, and the felon renegado who flies from the justice of his country, finds not only a refuge, but becomes a sainted minister in the sanctuary of its temple. No error can be more mischievous, than to underrate the danger of such a principle, and no policy can be more fatal, than to neglect it, from a contempt for the supposed insignificance of its agents. The experience of both France and Great Britain, fearfully instruct us, from what small and contemptible beginnings, this *ami des noirs* philanthropy may rise to a gigantic power, too mighty to be resisted by all the influence and energy of the government; in the one case, shrouding a wealthy and flourishing island in the blood of its inhabitants; in the other, literally driving the ministry, by means of an instructed Parliament, to perpetuate that act of suicidal legislation and colonial oppression, the emancipation of slaves in the British West Indies. It may be not unaptly compared to the element of fire, of which a neglected spark, amongst combustible materials, which a timely stamp of the foot might have extinguished forever, speedily swells into a sweeping torrent of fiery desolation, which no human power can arrest or control. In the opinion of intelligent West India planters, it is because the local authorities, from a sense of false security, neglected to hang up the first of these political missionaries that made their appearance on the British islands, that they are doomed to barrenness and desertion, and to be the wretched abodes of indolent and profligate blacks, exhibiting in their squalid poverty, gross immorality, and slavish subjection to an iron despotism of British bayonets, the fatal mockery of all the promised blessings of emancipation.

Under these circumstances, and in this critical conjuncture of our affairs, the solemn and responsible duty devolves on the legislature of "taking care that the republic receive no detriment."

The crime which these foreign incendiaries have committed against the peace of the state, is one of the very highest grade known to human laws. It not only strikes at the very existence of society, but seeks to accomplish the catastrophe, by the most horrible means, celebrating the obsequies of the state in a saturnial carnival of blood and murder, and while brutally violating all the charities of life, and desecrating the very altars of religion, impiously calling upon heaven to sanction these abominations. It is my deliberate opinion, that the laws of every community should punish this species of interference by death without benefit of clergy, regarding the authors of it as "enemies of the human race." Nothing could be more appropriate than for South Carolina to set this example in the present crisis, and I trust the legislature will not adjourn till it discharges this high duty of patriotism.

It cannot be disguised, however, that any laws which may be enacted by the authority of this state, however adequate to punish and repress offences committed within its limits, will be wholly insufficient to meet the exigencies of the present conjuncture. If we go no farther than this, we had as well do nothing. These outrages against the peace and safety of the state are perpetrated in other communities, which hold and exercise sovereign and exclusive jurisdiction over all persons and things within their territorial limits. It is within these limits, protected from responsibility to our laws by the sovereignty of the states in which they reside, that the authors of all this mischief, securely concoct their schemes, plant their batteries, and hurl their fiery missiles among us, aimed at that mighty magazine of combustible matter, the explosion of which would lay the state in ruins.

It will, therefore, become our imperious duty, recurring to those great principles of international law, which still exist in all their primitive force amongst the sovereign states of this confederacy, to demand of our sovereign associates the condign punishment of those enemies of our peace, who avail themselves of the sanctuaries of their respective jurisdictions, to carry on schemes of incendiary hostility against the institutions, the safety, and the existence of the state. In performing this high duty, to which we are constrained by the great law of self-preservation, let us approach our co-states with all the fraternal mildness which becomes us as members of the same family of confederated republics, and at the same time with that firmness and decision, which becomes a sovereign state while maintaining her dearest interests and most sacred rights.

For the institution of domestic slavery we hold ourselves responsible only to God, and it is utterly incompatible with the dignity and the safety of the state, to permit any foreign authority to question our right to maintain it. It may nevertheless be appropriate, as a voluntary token of our respect for the opinions of our confederate brethren, to present some views to their consideration on this subject, calculated to disabuse their minds of false opinions and pernicious prejudices.

No human institution, in my opinion, is more manifestly consistent with the will of God, than domestic slavery, and no one of his ordinances is written in more legible characters than that which consigns the African race to this condition, as more conducive to their own happiness, than any other of which they are susceptible. Whether we consult the sacred scriptures, or the lights of nature and reason, we shall find these truths as abundantly apparent, as if written with a sunbeam in the heavens. Under both the Jewish and christian dispensations of our religion, domestic slavery existed with the unequivocal sanction of its prophets, its apostles, and finally its great Author. The patriarchs themselves, those chosen instruments of God, were slave-holders. In fact, the divine sanction of this institution is so plainly written, that "he who runs may read" it, and those over-righteous pretenders and Pharisees, who affect to be scandalized by its existence among us, would do well to inquire how much more nearly they walk in the ways of godliness than did Abraham, Isaac and Jacob. That the African negro is destined by Providence to occupy this condition of servile dependence, is not less manifest. It is marked on the face, stamped on the skin, and evinced by the intellectual inferiority, and natural improvidence of his race. They have all the qualities that fit them for slaves, and not one of those that would fit them to be freemen. They are utterly unqualified, not only for rational freedom, but for self-government of any kind. They are in all respects, physical, moral, and political, inferior to millions of the human race, who have for consecutive ages dragged out a wretched existence under a grinding political depotism, and who are doomed to this hopeless condition by the very qualities which unfit them for a better. It is utterly astonishing that any enlightened American, after contemplating all the manifold forms in which even the white race of mankind are doomed to slavery and oppression, should suppose it possible to reclaim the Africans from their destiny. The capacity to enjoy freedom is an attribute not to be communicated by human power. It is an endowment of God, and one of the rarest which it has pleased his inscrutable wisdom to bestow upon the nations of the earth. It is conferred as the reward of merit, and only upon those who are qualified to enjoy it. Until the "Ethiopian can change his skin," it will be vain to attempt, by any human power, to make freemen of those whom God has doomed to be slaves, by all their attributes.

Let not, therefore, the misguided and designing intermeddlers who seek to destroy our peace, imagine that they are serving the cause of God by practically arraigning the decrees of his providence. Indeed it would scarcely excite surprise, if, with the impious audacity of those who erected the tower of Babel, they should attempt to scale the battlements of heaven, and remonstrate with the God of wisdom for having put the mark of Cain and the curse of Ham upon the African race instead of the European.

If the benevolent friends of the black race would compare the condition of that portion of them which we hold in servitude, with that which still remains in Africa, totally unblessed by the lights of civilization or christianity, and equally destitute of hope and of happiness, they would be able to form some tolerable estimate of what our blacks have lost by slavery in America, and what they would gain by freedom in Africa. Greatly as their condition has been improved, by their subjection to an enlightened and christian people, (the only mode under heaven by which it could have been accomplished,) they are yet wholly unprepared for any thing like a rational system of self-government. Emancipation would be a positive curse, depriving them of a guardianship essential to their happiness, and they may well say in the language of the Spanish proverb, "save us from our friends, and we will take care of our enemies." If emancipated, where would they live, and what would be their condition? The idea of their remaining among us is utterly visionary. Amalgamation is abhorrent to every sentiment of nature; and if they remain as a separate caste, whether endowed with equal privileges or not, they will become our masters, or we must resume the mastery over them. This state of political amalgamation and conflict which the abolitionists evidently aim to produce, would be the most horrible condition imaginable, and would furnish Dante or Milton with the type for another chapter illustrating the horrors of the infernal regions. The only disposition, therefore, that could be made of our emancipated slaves, would be their transportation to Africa, to exterminate the natives, or be exterminated by them; contingencies, either of which may well serve to illustrate the wisdom, if not the philanthropy, of those super-serviceable madmen, who in the name of humanity would desolate the fairest region of the earth, and destroy the most perfect system of social and political happiness that ever has existed. It is perfectly evident, that the destiny of the negro race is either the worst possible form of political slavery, or domestic servitude, as it exists in the slave-holding states.

The advantage of domestic slavery over the most favorable condition of political slavery, does not admit of a question. It is the obvious interest of the master, not less than his duty, to provide comfortable food and clothing for his slaves; and whatever false and exaggerated stories may be propagated by mercenary travellers who make a trade of exchanging calumny for hospitality, the peasantry and operatives of no country in the world are better provided for in these respects, than the slaves of our country. In the single empire of Great Britain, the most free and enlightened nation in Europe, there are more wretched paupers and half-starving operatives, than there are negro slaves in the United States. In all respects, the comforts of our slaves are greatly superior to those of the English operatives, or the Irish and continental peasantry, to say nothing of the millions of paupers crowded together in those loathsome receptacles of starving humanity, the public poor-houses. Beside the hardship of incessant toil, too much almost for human nature to endure, and the sufferings of actual want driving them almost to despair, those miserable creatures are perpetually annoyed by the most distressing cares for the future condition of themselves and their children.

From this excess of labor, this actual want, and these distressing cares, our slaves are entirely exempted. They habitually labor from two to four hours a day less than the operatives in other countries, and it has been truly remarked by some writer, that a negro cannot be made to injure himself by excessive labor. It may be safely affirmed, that they usually eat as much wholesome and substantial food in one day as English operatives or Irish peasants eat in two. And as regards concern for the future, their condition may well be envied even by their own masters. There is not upon the face of the earth, any class of people, high or low, so perfectly free from care and anxiety. They know that their masters will provide for them, under all circumstances, and that in the extremity of old age, instead of being driven to beggary, or to seek public charity in a poor-house, they will be comfortably accommodated, and kindly treated, among their relatives and associates. Cato the elder, has been regarded as a model of Roman virtue; and yet he is said to have sold his superannuated slaves, to avoid the expense of maintaining them. The citizens of this state may not aspire to rival the virtue of the Romans; but it may be safely affirmed, that they would doom to execration that master who should imitate the inhuman example of the Roman paragon. The government of our slaves is strictly patriarchal, and produces those mutual feelings of kindness on the part of the master, and fidelity and attachment on the part of the slave, which can only result from a constant interchange of good offices, and which can only exist in a system of domestic or patriarchal slavery. They are entirely unknown either in a state of political slavery, or in that form of domestic servitude which exists in all other communities.

In a word, our slaves are cheerful, contented and happy, much beyond the general condition of the human race, except where those foreign intruders and fatal ministers of mischief, the emancipationists, like their arch-prototype in the garden of Eden, and actuated by no less envy, have tempted them to aspire above the condition to which they have been assigned in the order of providence.

Nor can it be admitted, as some of our statesmen have affirmed, in a mischievous and misguided spirit of sickly sentimentality, that our system of domestic slavery is a curse to the white population—a moral and political evil, much to be deplored, but incapable of being eradicated. Let the tree be judged by its fruit. More than half a century ago, one of the most enlightened statesmen who ever illustrated the parliamentary annals of Great Britain, looking unto political causes, with an eye of profound philosophy, ascribed the high and indomitable spirit of liberty which distinguished the southern colonies, to the existence of domestic slavery; referring to the example of the free states of antiquity as a confirmation of his theory. Since those colonies have become independent states, they have amply sustained the glory of their primitive character. There is no coloring of national vanity in the assertion, which impartial history will not ratify, that the principles of rational liberty are not less thoroughly understood, and have been more vigilantly, resolutely and effectively defended against all the encroachments of power, by the slave-holding states, than by any other members of the confederacy. In which of our great political conflicts is it, that they have not been arrayed against every form of usurpation, and fighting under the flag of liberty? Indeed, it is a fact of historical notoriety, that those great whig principles of liberty, by which government is restrained within constitutional limits, have had their origin, and for a long time had their only abiding-place, in the slave-holding states.

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Though the right to emancipate our slaves, by coercive legislation, has been very generally disclaimed by popular assemblages in the non-slave-holding states, it is nevertheless important, that each of those states should give this disclaimer the authentic and authoritative form of a legislative declaration, to be preserved as a permanent record for our future security. Our right to demand of those states the enactment of laws for the punishment of those enemies of our peace, who avail themselves of the sanctuary of their sovereign jurisdiction to wage a war of extermination against us, is founded on one of the most salutary and conservative principles of international law. Every state is under the most sacred obligations, not only to abstain from all such interferance with the institutions of another as is calculated to disturb its tranquility or endanger its safety, but to prevent its citizens or subjects from such interference, either by inflicting condign punishment itself, or by delivering them up to the justice of the offended community. As between separate and independent nations, the refusal of a state to punish these offensive proceedings against another, by its citizens or subjects, makes the state so refusing an accomplice in the outrage, and furnishes a just cause of war. These principles of international law are universally admitted, and none have been more sacredly observed by just and enlightened nations. The obligations of the non-slave-holding states to punish and repress the hostile proceedings of their citizens against our domestic institutions and tranquility, are greatly increased both by the nature of those proceedings, and the fraternal relation which subsists between the states of this confederacy. For no outrage against any community can be greater than to stir up the elements of servile insurrection, and no obligation to repress it can be more sacred than that which adds to the sanctions of international law the solemn guarantee of a constitutional compact, which is at once the bond and the condition of our union. The liberal, enlighted and magnanimous conduct of the people in many portions of the non-slave-holding states, forbids us to anticipate a refusal on the part of those states to fulfil these high obligations of national faith and duty. And we have the less reason to look forward to this inauspicious result, from considering the necessary consequences which would follow, to the people of those states and of the whole commercial world, from the general emancipation of our slaves. These consequences may be presented, as an irresistable appeal, to every rational philanthropist in Europe or America. It is clearly demonstrable, that the production of cotton depends not so much on soil and climate as on the existence of domestic slavery. In relaxing latitudes, where it grows, not one half the quantity would be produced, but for the existence of this institution, and every practical planter will concur in the opinon, that if all the slaves in these states were now emancipated, the American crop would be reduced, the very next year, from one million two hundred thousand, to six hundred thousand bales. No great skill in political economy will be required to estimate how enormously the price of cotton would be increased by this change, and no one who will consider how largely this staple contributes to the wealth of manufacturing nations, and to the necessaries and comforts of the poorer classes all over the world, can fail to perceive the disastrous effects of so great a reduction in the quantity and so great an enhancement in the price of it. In Great Britain, France, and the United States, the catastrophe would be overwhelming; and it is not extravagant to say, that for little more than two millions of negro slaves cut loose from their tranquil moorings and set adrift upon the untried ocean of at least a doubtful experiment, ten millions of poor white people would be reduced to destitution, pauperism and starvation. An anxious desire to avoid the last sad alternative of an injured community, prompts this final appeal to the interests and enlightened philanthrophy of our confederate states. And we cannot permit ourselves to believe, that our just demands, thus supported by every consideration of humanity and duty, will be rejected by states, who are united to us by so many social and political ties, and who have so deep an interest in the preservation of that union.

From the Richmond Whig.

EXTRAORDINARY CROP OF CORN.

Mr. Robert Ship, the manager of the plantation of Mr. Tarlton Fleming, Goochland county, has sent us a certificate of an extraordinary crop of corn raised by him the present year, *namely, eleven hundred barrels* from an *eighty acre field*, which is about fourteen barrels to the acre.

WAGES OF FEMALE LABOR.

To the Editor of the Farmers' Register.

I have read very carefully the three Nos. on the low rate of female wages, and it is not saying too much, that I was very deeply interested in them. They brought to memory interesting and painful occurrences that had fallen under my own observation. I have known a healthy and industrious woman to labor 14 hours a day with her needle, and earn 12½ cents, having five children to support, and all of these children doing nothing—(for they had nothing to do, in which their mother could be present to instruct them)—and I have known her poor neighbor (also a widow) and her one little boy to earn in 12 hours, from 75 cents to $1 25 cents in a tobacco factory, in a little corner by themselves, separate from the black people. I have seen direct and systematic means employed to raise the wages of seamstresses, and in every case, while good was done, and suffering, for the time, sowewhat relieved, the association soon exhausted all its means, and went down. Some of the writer's remarks too, brought to my mind the fact announced by a missionary in the island of Ceylon, viz: that there, it is very common to see strong men washing and ironing nice cambrics and muslins. Have not the habits of Christian communities much of the very same absurdities in them? No man can travel through New-England without feeling that there, women have decided advantages over women in the south. The avenues to a fair compensation for labor are abundantly more open there, than here. I have, during the last summer, visited many of the northern factories in special reference to the point of morals, and I have satisfied myself, that on the whole, the morals of young people at *their* factories are as good as among the same class of people on farms. It seems to me also, that in this country there is no lack of *soil*, on which profitably to cousume the strength of the great body of males, and that we are specially criminal if we allow a system to gain footing among us, which shall in the end ruin the prospects of indigent but virtuous females. Agriculture and horticulture in this land are yet merely in the rudest state, especially the latter.

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CONSTITUTIONS OF AGRICULTURAL SOCIETIES.

We have received from a valued correspondent, and one whom we would be pleased to serve or gratify, a copy of the constitution of a new agricultural society, with the request to publish it in the Farmers' Register. We are debarred from compliance,by the obligation of a rule which has been for some time in force, which is, *not* to publish in this journal the constitution or rules of any agricultural society, unless the provisions require notice for their novel or peculiar character, or unless inseparably connected with other transactions of more interest and practical value to the agricultural public. We have seen published, within the last fifteen years, the constitutions of some dozens of different agricultural societies, from not one of which was any subsequent action of value, or report of agricultural facts, ever heard. This procedure has indeed been so common, and has so generally served to introduce to public notice a body that has not attracted notice in any other way—the publication of the constitution has so often been the prelude to the dissolution of the society—that such publications have ceased to confer honor—and indeed have almost become a subject for ridicule. We think it best therefore for agricultural societies not to publish their *sayings* until they can accompany them with something of their *doings*—and though desirous of avoiding the publication of the former class, if alone, we shall be at all times rejoiced to receive reports of, and promulgate the *acts*, of all agricultural societies. There can be no newly formed society of which we would form a more favorable opinion (judging from its materials) than the one to which we are now compelled to show such an appearance of scant courtesy: and should it take the rare course of drawing out the talents of its members, we hope hereafter to have many of our pages filled by their memoirs, transactions, and reports of their useful labors.

MEANS TO FACILITATE THE ANALYZING OF MARL, AND OTHER CALCAREOUS MANURES, AND SOILS.

While the importance of testing the strength and comparative value of marls, has been earnestly urged on those who are using, or intend to use such manures, this journal has also furnished plain and full directions for the process, by attending to which, any careful experimenter would be enabled to perform the operation for himself, with a suffieient degree of accuracy for practical and common purposes. With the hope of still more advancing this object, we have caused to be made,for sale,several sets of the apparatus invented by Professor W. B. Rogers, and described by him at page 354, vol. II of Farmers' Register. Owing to the difficulties which have attended the manufacture of instruments so novel and delicate, and requiring so much skill and accuracy in the construction, we have waited long for the supply—but have just learned that the articles are now ready, and will be delivered in Petersburg, perhaps before this number will be issued.

But even with this new facility, we doubt (judging from experience) whether more than a few individuals will take the trouble to test the value of their calcareous manures. Some indeed have already availed themselves of the instructions given for this purpose. But much the greater number have entirely neglected this very necessary part of the business of marling, unless they could have the testing done by some other person. We have complied with many requests for such services—and have never grudged the labor, when it promised to be of service to the public, and to aid the extension of improvements by calcareous manures—nor even to serve the private interests of personal friends. But there have been so many such demands on our time and labor, that a part have been necessarily neglected, and others have been attended to only after much delay.

It has occurred to us that the wishes and convenience of all parties might be promoted by the establishment of a suitable laboratory for this limited but useful branch of operative chemistry, and making it the business of a competent operator to examine all specimens of marl, &c. sent for that purpose. This, like every other kind of mechanical labor, can be executed more easily and cheaply, as well as more perfectly, on a large than on a small scale. With suitable apparatus and arrangements, an operator could test the strength of twenty specimens of marl, with more ease and correctness than a single specimen, if tried alone, and under the ordinary disadvantages. If therefore such a new business was enough encouraged, correct trials of specimens and reports might be obtained at a less cost for each, than the mere trouble attending a single trial even to the experienced and skilful analyst.

Any persons who may desire to obtain such services, *for their own private convenience or profit*, may send specimens for examination, to our care—and should the demand justify the means, a competent operator will be induced to undertake the trouble, for the profit. Our apparatus (Davy's, as well as Rogers',) and our instructions, will be given in aid of the objects, and such general attention as will secure our entire confidence in the correctness of the results reported. If no other conveyance offers, very small specimens (say 20 grains each,) may be sent by mail, *postage paid*. In that case, each specimen should be dried, pounded and secured by paste in a separate small paper cover. The postage on an ounce package is the same as on a quadruple letter. If larger specimens are sent, so as to show the appearance of the earth as presented naturally, they should be well wrapped separately, to prevent any communication or mixture, and the whole closely packed in a strong box, for transportation.

The charge for such examinations must depend somewhat on the extent of the business: but it cannot exceed 50 cents for a single specimen—nor half that rate for each of 20 specimens provided at once. It should be understood that the proportion of *calcareous earth* (or *carbonate of lime*,) contained, is the only ingredient which is undertaken to be ascertained with certainty. Other ingredients (if supposed to be present, and required to be known,) might demand not only far more labor, but also more skill and science then we would promise could be exercised.

CHANGE OF ADDRESS—NOTICE TO CORRESPONDENTS AND SUBSCRIBERS TO THE FARMERS' REGISTER.

The Farmers' Register will hereafter be published in Petersburg, Va. to which place all letters to the editor must be directed. As the editor has no longer the franking privilege, (as postmaster,) and as the widely extended correspondence which exists, (and is necessary, for properly conducting such a publication,) will make the tax of postage very heavy under any circumstances, he requests of his patrons and correspondents, so far as their convenience may permit, to adopt such modes of transmitting payments, and other communications on *private* business, as may somewhat lessen this burden.

The change of circumstances especially requires that the editor should withdraw his former request to have small specimens of particular soils, &c. *sent by mail* for examination. By the attention paid to that request by several correspondents, he has been greatly obliged, and he may dare to say, that agricultural science has been thereby advanced.

VOL. I. OF FARMERS' REGISTER.

By procuring some of the deficient Nos. a few more copies of Vol. I. have been made complete, and may be obtained at $5, by the earliest applicants for entire sets of the work, including the current Vol. III.

For any single No. of the first Vol. from 1 to 9, inclusive, returned uninjured, *and free of postage*, a No. of Vol. II. or III. will be given in exchange. For each one of a few copies of Nos. 2 and 6, Vol. I. $1 will be paid on delivery, or 3 later odd Nos. The second Vol. bound up with the Essay on Calcareous Manures will be given for each set of the first 9 Nos. of Vol. I. returned as above.

TERMS OF THE FARMERS' REGISTER.

1. The Farmers' Register is published in monthly numbers, of 64 large octavo pages each, and neatly covered, at $5 a year—payable in advance.

2. Or five *new* subscribers by sending their names and $20 at one time to the editor, will receive their copies for one year, for that sum, or at $4 for each. Purchasers of any 5 volumes (except Vol. I.) at one time in like manner, shall have them for $20.

3. The risk of loss of payments for subscriptions, which have been properly committed to the mail, or to the hands of a postmaster, is assumed by the editor.

4. For all copies not received by mail, duplicates will be furnished to those subscribers who have complied with their own obligations.

5. If a subscription is not directed to be discontinued before the first number of the next volume has been published, it will be taken as a continuance for another year. Subscriptions must commence with the beginning of some one volume, and will not be taken for less than a year's publication.

6. The mutual obligations of the publisher and subscriber, for the year, are fully incurred as soon as the first number of the volume is issued: and after that time, no discontinuance of a subscription will be permitted. Nor will a subscription be discontinued for any earlier notice, while any thing thereon remains due, unless at the option of the editor.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

For the Farmers' Register.

SUGGESTIONS FOR THE IMPROVEMENT AND PROFITABLE CULTURE OF POOR LAND.

To T. B. A. of CAROLINE.

Dear Sir—

The strongest sympathies are said to arise from community of suffering: if this be true, you and I should be friends. Your communication in the March No. of the Register, produced so much interest, that I commenced a letter to you soon after reading it. Being interrupted by business, it was lost while in an unfinished state. But the interest has been kept up, and *incog*. as you are, I still feel disposed to address you, although conscious that my letter will contain little worthy of notice, besides an expression of good feeling.

The detail of your situation so exactly depicted my own, except in small matters of time and locality, that some of my friends suspected me of writing it. I too am a *poor land* farmer, and follow a profession which requires that I keep horses not used in the plough—more of them, I fear, than I manage to render profitable. If, however, I were the owner of the richest lands, my feelings of regard would be called forth towards him, who might be striving to learn the means of fertilizing the extensive portions of our state, which are impoverished, and which have, as yet, defied efforts at improvement.

While I fully subscribe to nearly all the doctrines of the Editor of the Farmers' Register in relation to the constitution of soils, my first thoughts, on reading his remarks, and those of "Commentator" on your communication in the March No., were of Job's comforters. By this, I by no means intend disparagement on either of these gentlemen, my feelings of regard for the first of whom I would not attempt to express, in his own periodical; and the latter I suspect to be a gentleman, to whom (though personally unacquainted with him,) I have long felt that I owed much, both for his political and agricultural writings.

When the great question arises, "should all attempts to improve the lands in Virginia, naturally poor, and denied the benefit of calcareous manures, be relinquished?" too much is involved to treat it lightly, or to form hasty conclusions. Some of the finest specimens of population on earth may be found in various parts of Virginia, on lands "born poor." Perhaps the necessity for exertion, produced by this poverty of soil, has contributed to the improvement of their morals. I would not argue from this, that poverty of soil is always a blessing. But that, like many other evils in this world, it may be converted into the means of doing good, if connected with proper dispositions in those who have to contend with it. The same people, on the same soils, if they could discover any mode of more extensively improving them, would improve with them. But here is the difficulty. Can poor lands be improved without calcareous manures, on a scale sufficiently extensive to render them the abiding places of a thriving—a happy and virtuous people. Prove that this can be done, and it will be the most effectual mode of arresting the awful tide of emigration, going on from our beloved land. And if it cannot be done without calcareous manures, we should, with all possible despatch, construct rail roads to the most convenient points for obtaining them. "Don't give up the ship."

When I suggest some steps towards effecting an object so desirable, (however dogmatic, for the sake of brevity, may be my manner,) I beg you not to suspect me of the vanity of aiming to instruct my *incognito* friend, from whom I should be glad to learn. Through you, I address many, some of whom may meet a useful suggestion. But lest my suggestions should prove like the Frenchman's dinner, too short for the long grace preceding it, I will wave further introduction.

In attempting to improve our soils, we should never forget, that the great defect in their constitution, consists in a deficiency of calcareous matter; this should lead us—

1. To seek out, at all times, every available mode of supplying such matter.

2. To diffuse manures over our fields, according to their powers of retention, or their natural grade of fertility, recollecting that the redundant manure applied to any spot, beyond its power of retention, will be converted into gas, and escape as soon as complete decomposition occurs. This evaporation takes place also (though more slowly) in calcareous soils, rendering occasionally meliorating crops necessary, to prevent its injury. Our soils need greater attention to such crops, as from them evaporation is more rapid.

3. We should remember that a soil defective in calcareous matter, is, according to the degree of that defect, less adapted to the production of grain, and grasses producing granular seed, and the better suited to the growth of weeds. The truth of the first clause of this proposition is indisputable. Every kind of grain, and especially wheat, is produced in greater quantity and with greater certainty, on calcareous lands. The latter clause is equally clear to observation, and, possibly, very important inferences may be drawn from it. We find that fence corners, and other places so much infested with weeds in Eastern Virginia, are almost clear of them in the neutral soils of the Valley. No land yields more luxuriant tobacco than that covered with the heaviest coat of broom-straw, if properly manured. This weed grows also in its highest perfection, in some districts, which yield nothing else well, now cultivated. Chaptal, while treating of the cultivation of woad, (*Isatis Finctoria*.) a weed raised in France, from which indigo is extracted, observes—"The nature of the manure which is employed in the culture of woad exerts a powerful influence, not only upon the vegetation of the plant, but upon the quantity and quality of its coloring principle.

"The manures which consist of well decomposed animal and vegetable substances are the best, and for this reason, night soil, the dung of sheep and cows, the decayed fragments of wool and silk and the chrysalides of the silk-worm are preferred to any other manures.

"Those substances that act as stimulants to vegetation, such as lime, plaster, marine salt, poudrette, mortar-rubbish, ashes, &c. favor the growth of the plant, *without affecting their coloring principle.*" *Chemistry applied to Agriculture, Boston Ed. pp.* 295, 296.

Calcareous manures having so recently attracted much attention in this country, our opportunities of making observations of this nature have been rare. It is, however, rather probable, that such manures, while they bring to earlier maturity, will not increase or improve the peculiar qualities of other plants, besides the different kinds of grain and most of the grasses. Further agricultural developements may deduce important results from the foregoing principles. Should we, who are almost excluded from the benefits of calcareous manures, ever cultivate largely the poppy, woad, the whole class of root crops, (which I think need but little lime,) and many other plants which may be found to thrive best in soils not calcareous, we may be almost equally indebted to those who have developed the principles connected with lime, as a manure, in its various forms, with those who possess such advantages in the highest degree.

Horizontal ploughing, hill-side ditching, manuring, and the cultivation of grasses, are the means on which I would mainly depend in attempting to improve our lands.

Having given some of my views in relation to levelling and manuring, in previous Nos. of the Register, they need not be repeated here. A few further remarks may, however, be made on the preparation of manures. You would be surprised, sir, to find how much material for making manure you could amass in a short time, if proper preparation were previously made. This consists in furnishing every hand you can muster (except the drivers,) with a good sharp rake, and every pair of wheels on the land with a large, light body, for hauling leaves and other rubbish to be rotted in the farm-pen, or rather, farm-pens—for I would have several of them in convenient locations for hauling out the manure, after it is made. One of them should have in it a good cow-house, to shelter the cattle in bad weather. This may be made of corn tops, or otherwise, as suits you. Last winter, as bad as the weather was, I spread leaves on about seventy acres of land, with about fifteen hands, six horses—generally worked singly in carts—and seven oxen. The oxen were worked, one yoke at a time, to the same cart, so as to rest each other. The leaves for somewhat more than one-third of the field were previously prepared in the farm-pen. The rest of them were injudiciously spread on the land as they came from the woods. These last did but little good to the corn, as it got its growth before they began to rot much—June, and July (until the last of it) being, with me, very dry months. I think, however, that I have made fully double the corn that I could have made on the whole field, without manure.

I have been told that what are commonly called ground-slides, with pieces of iron eighteen inches long, bent into the segment of a circle, and nailed to the bottom of each runner, to bear the weight and prevent friction, serve better than horse-carts to haul leaves for short distances.

After getting all the litter possible into your pens, the next business is, to prepare it for yielding you the greatest and speediest profit. Besides the ordinary commixture with animal manure, the drainings from the pens should be caught in pits dug for the purpose, and sprinkled over the litter (with a large watering pot) as soon as it is dry enough to receive them. The dirty water and soap-suds made by washing clothes in the family, is also worth saving for this purpose. There are many other substances which might be profitably used in this way. The blood of animals slaughtered on the farm, if mixed with water, in the proportion of one part to twenty, might considerably enrich a bed of leaves or other litter. The filthy suds of a kitchen, if deposited in a strong tub and borne off daily, constitute a good article for top-dressing, or for impregnating litter. Before heaping your beds of litter, which I think should be done once in two or three weeks, through the winter, sow on all the ashes you can procure. The quantity of this article will be greater than you would suppose, if you will supply every negro house with an old barrel, and see that they are periodically taken up and secured. You may do your neighbors a favor by purchasing at a very low price, such as they would otherwise throw away. Your example and success might teach them economy in the use of manures. It might be well to make your calculations, whether you could not profitably afford to buy lime in moderate quantities, and potash to sprinkle over your litter, before heaping. The latter should be dissolved in water and applied with a watering pot.

I know from experience that top-dressing on wheat, with both lime and ashes, at the rate of only four or five bushels to the acre, much improves the wheat, and secures the life and comparative vigor of the young clover, on poor land. Wheat, however, should not—as a general rule—be sown on poor land.

Success from manuring does not depend so much on the mere quantity of matter used, as upon a judicious mixture of all those substances entering into the composition of the crop to be raised on the land. And the fluids, &c. mentioned above, not only hasten the putrefaction of the litter, but furnish nutriment for the crop which it could not derive from the litter alone. It is on this principle, that a little rich compost will frequently cause a more abundant harvest than the greatest profusion of ordinary manure. It would be well for the farmer to make out a list of all the substances within his reach, which can be profitably used as manure, and to avail himself of them whenever an opportunity is presented.

In the prosecution of the foregoing plans, it is evident that the corn-field will be considerably diminished in size. This need not create concern, if the crop is increased. But in the commencement of such a system, requiring the whole corn field to be manured, we must calculate on rather small crops of corn—though they will, in some seasons, be much larger. The deficiency must be supplied by preparing for an abundance of suitable substitutes for corn. The chief reliance, for this purpose, should probably be placed on oats. The time usually occupied in tending three times the quantity of land in corn, as is here contemplated, to almost no purpose, might be employed in gathering materials for manure, in shrubbing out sassafras, persimmon, and other bushes, in turning under the running blackberry, and other smaller nuisances; and thus you might prepare, besides your small corn-field, an extensive fallow for oats, and (if you sow early enough,) make a large crop of this valuable grain. With a plenty of oats we may get along pretty comfortably, with but little more corn than enough for bread. As food for horses, barley has great reputation. In confirmation of this, the Arabian horses which get no other grain, may be cited. It is said to thrive best in a rich sandy soil, and an arid climate. With it, however, I have no experience. For feeding animals, mangel wurtzel, Guinea grass, ruta baga, turnips, and a variety of other articles, may profitably be prepared. Mangel wurtzel, or field-beet, grows most astonishingly in Virginia, wherever I have seen it tried. I have reared an amazing crop of it this year, on poor land, manured in the drill, after turning under a moderate coat of leaves from the woods. This crop should be harvested before the accession of hard weather, be put away dry, and well secured from frost.

Much effort is sometimes made to get the corn land broken up in the fall and winter. This is important in stiff soils, but if the land be light, and there is but little vegetable cover on it, I should prefer spending the time in the preparation of manure.

Those who have rich lands must judge for themselves, with regard to a rotation of crops. *We* must be guided by necessity. The best rule, perhaps, is to cultivate in corn no more than we can manure, and in small grain all the corn-field of the preceding year, and all that we can prepare with a clean nice fallow. You may begin to think about the most suitable rotation after getting over the arable part of your farm with corn and manure, that is, after getting something fit to make a rotation on. But it may be said that "the rats will be crying" over the part you commenced on before you get through. To prevent this, besides catching as many of these rascals in traps as possible, and thus giving them something else to cry about; sow grasses on as much of your land as possible—clover on such as will grow it well, and on the poor land sow burnet, Peruvian grass, herds grass, or any other kinds which you can reasonably expect to grow.

The subject of grass has been strangely neglected in Virginia. No good northern or English farmer would think of leaving a field bare of grass, after cultivating a hoe crop. We know little, generally, of other grasses than clover, timothy, and herds grass—and much too little of them.

Clover will seldom grow on lands, naturally poor, and artificially exhausted, until after they have been manured. Hundreds of our citizens, since the publication of the Register and the Cultivator—not the readers of these works, however—have been purchasing clover seed with the vain hope of enriching their poor lands, by the instrumentality of clover and plaster. I believe, that—at least in the southern part of our state—there is but little land naturally poor, possessing such adaptation to be enriched by clover and plaster, as Columbia county, New York. I know, from expensive experiments too, that mine does not. I find that after improving it, these articles, if properly used, will keep it in good heart. But they will not do to start with. If the clover is desired to feed on, it should be sown on lots already enriched. It may be true, in some localities, that poor land can be enriched by clover and plaster. With me, the proposition is reversed. I can only grow clover, to advantage, on land already improved: and even then, the efficacy of plaster is very uncertain. By the way, I would thank him who would explain to me, why this article is so capricious in its action. I have taken much pains to procure pure gypsum, but have found it sometimes failing to show any benefit at all—at others, succeeding wonderfully: and some of the parcel which failed one year, succeeded remarkably the next. And all this, on lands very similar.

The following questions, in relation to the clover crop, merit consideration. 1. Is it generally best to cut the first crop, reserving only the fall crop to plough in; or should the whole year's product be turned under? 2. Should clover be turned under while unripe, or in the mature state?

1. If the land be strong enough to produce a crop sufficiently tall to be cut by the 20th of May, I should cut it, with the expectation that before winter, it would again produce as much vegetable matter as there is any necessity for turning under ground—and, believing the hay better when cut early, than after the seed are matured. Moreover, the general fertility of the tract cannot be diminished, if the hay be consumed on the farm, and the manure properly attended to. If, however, the spring be late, and the state of the land render the production of a plentiful fall crop doubtful, and it be important to keep up the fertility of the particular spot on which the clover grows, it might be best not to take the spring crop off the land. There is with us, but little ground strong enough to produce a copious second crop, unless it be started to growing, by a removal of the first, as early as about the 20th of May.

2. Most plants are thought to throw their most nutritious particles into their seed. The seed of clover, when turned under, lie as dormant—so far as the immediate improvement of the land is concerned—as so many grains of sand. The stalks and leaves then, being deprived of the nutriment which has gone into the seed, must yield less to the soil than if they had been ploughed in before this occurred. While there is honey in the blossom, I should judge to be the best time to plough under the crop. At this juncture, it may be supposed, that all the nutritious matters about to pass into the seed, are formed in the plants, and would be given to the soil, if properly ploughed in. These rules, I suppose, would be applicable to the cultivation of other grasses. It is believed, that our northern farmers are in the habit of turning under all grasses designed to meliorate the land before they come to maturity, and that in this, they have the advantage of us.

We are much in the habit of cultivating grasses, by way of mere *project*—and of course, we attend to them, only when our other business seems to afford leisure. This leisure rarely occurs, and the grasses are rarely attended to. Were we determined to convert the grasses into market crops, there would be much more hope of success. Hay sells well, in most parts of our state, at all times; and at the present prices of grass-seed, as much might doubtless be made by raising them for sale, as could be, from the same ground in wheat. If we would raise grass-seed successfully, we should prepare plots of ground nicely, for the special purpose. If reliance be placed on the large fields intended for hay-making or grazing, for this purpose, it is very liable to be foiled. Clover-seed may, however, be gathered from large fields. These, I have been in the habit of gathering with a clover-comb, drawn by a horse—such as is described and represented by a plate in the first volume of the American Farmer. With this implement they may be gathered, in clean grounds, with more facility and rapidity than by any other mode known to me. My grounds have of late been infested by a species of stick-weed, bearing a small white blossom in autumn, which not only prevents the use of the implement, but, by overshadowing the clover, greatly diminishes the crop of seed.

I cannot close these hurried remarks, without pressing on your attention the value of the root-crops, more especially the mangel wurzel, beet, and ruta baga turnip. Either of them may be raised in great quantities on ordinary corn land, if manured in the drills, and occasionally top-dressed through the season. This last labor may be performed by women and children. I pray you, try these crops. The first should be sown in April, the last, about the 25th of June. Ruta baga turnips have lost character, and been discarded by many, because they would not come to maturity when sown late. These may be raised to great advantage, if drilled between cabbages, strawberries, &c. in the garden, and slightly top-dressed. My beeves, milch cows, pigs, &c. are now enjoying these roots, and I am highly pleased with their effects. I mix and boil them with other kinds of food, which are not succulent. The improvement in the milk, in quantity and quality, since feeding on mangel wurtzel is very manifest, and the cows have fattened remarkably.

I have, now, sir, according to the best of my ability, and the little interrupted portions of leisure allowed me, given you some of my desultory, and of course, tedious views, on the improvement of land. I have not done this, from a vain belief that I was capable of being a teacher of agriculture; but because I felt the force of your strong call for attention to the subject of improving "poor land." While I consider most of the schemes for speedily and easily effecting such a purpose as entirely visionary, I do believe that with great labor, judiciously applied, poor lands may be profitably improved. Let any candid man go into the county of Fluvanna—somewhat proverbial for its poor land—and observe what fine crops of wheat and tobacco are raised—how well the people live, and what fine people many of them are—let him notice the tracks made by some of the patriotic citizens of that county, for many miles from their dwellings, in the way of improving roads, and other public-spirited efforts, and he could not find it in his heart to discourage their hopes of improving their "poor lands." Even if such regions cannot be made rich, they form much of the strength of our state—and had much better remain as they are, than be abandoned.

On parting, I tender you my best wishes, hoping to hear from you occasionally in the "Register."

"In ploughman phrase, "God send you speed,"
Still daily to grow wiser—
And may you better reck the *rede*
Than e'er did the adviser."

Yours,

M. N.

From the British Cyclopædia.

NATURAL HISTORY OF THE CHEESE MITE, OR JUMPER.

A small white fleshy grub of an elongated form, often found in decayed cheese, and which is the larva of a pretty two-winged fly, known by the systematic name of *Piophila casei*. Of this insect the immortal Swammerdam has left us an interesting account; and though to unthinking persons it may appear to be a frivolous subject of inquiry, we find the illustrious philosopher affirming "that the limbs and other parts of this worm are so uncommon and elegant, and contrived with so much art and design, that it is impossible not to acknowledge them the work of infinite power and wisdom, to which nothing is hid, nothing impossible." It has been a common error that these insects were bred spontaneously from the cheese, and epicures accordingly do not hesitate to eat them with great gout, thinking them formed from the very best of the cheese, whereas they are produced from eggs deposited therein by the parent fly. These larva are long, cylindrical, and composed of twelve rings, the first of which is furnished with two small bent hooks of a black color, which serve not only as teeth, but for feet also, the insect having no other organs employed as legs. The terminal segment of the body is covered with a variety of prominent tubercles and little cavities like wrinkles, of which we will presently see the use. When this larva prepares to leap, it first erects itself on its anus, in doing which it is greatly assisted by the prominent tubercles of the terminal ring, which enable it to maintain an equilibrium. It then bends itself into a circle, and having brought the head towards the tail, it stretches out the two hooks of the mouth, fixing them into the two cavities at the extremity of the body. It then contracts the body from a circular to an oblong figure, the contraction extending in a manner to every part of the body. It now suddenly, and with great violence lets go its hold, and the elastic force of the body returning to its natural position, produces a leap to a considerable height and distance, at least twenty-four times greater than the length of its own body. Here we cannot but admire the powers given by nature to different creatures, and their limitations, to answer different purposes, and not for mischief to mankind. If, for instance, a power of motion, proportionably equal to that possessed by this insect, had been given to the serpent tribes, how much more terrible would they not have been rendered, than with their present capabilities? A viper would throw itself nearly a hundred feet upon the traveller, and the rattle-snake several hundred.

Swammerdam, after giving a minute account of the external and internal anatomy of this creature, observes, "now let the sharpest geniuses, and men of the greatest penetration and learning, judge if a creature, on the fabric of which there plainly appears so much art, order, contrivance, and wisdom, nay, in which is seen the hand itself of the omnipotent God, could possibly be the production of chance or rottenness?" The female fly is provided at the extremity of the body with a very fine retractile borer or ovipositer, wherewith she pierces the cheese and at the same time deposites her eggs in the wound thus made. Shortly afterwards the grubs are hatched, and feeding upon the cheese cause it to decay: the fine powder which we perceive, and which is so highly prized by the gourmand, being nothing else but the excrement of these grubs, which, when they have attained their full size, desert the cheese, and in three or four days they loose all motion, grow stiff, become hard, and contract their bodies into an oval mass not more than half their previous length, within which the real pupa is inclosed: this insect undergoing the coarctate kind of metamorphosis, like the majority of two-winged insects. After remaining some time in this state, the chrysalis becomes of a black color, and the enclosed nymph breaks that part of the outer covering which defends its head into two parts, and at the same time throws off from every part of the body a thin and slight membrane which it leaves within the old case. At first the wings are scarcely perceivable, the insect however, runs abroad very quickly, and shortly afterwards the wings are by degrees extended into full length, when the insect is fitted for pursuing its duties, which almost entirely consist in the reproduction of the species. The fly is about the size of the grub, of a shining blackish green color, the wings transparent and shining, and the legs varied with ochreous and black.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

On the improvement of British wool.

[Concluded from p. 523 Vol. III.]

In describing the fleeces of this country, Mr. Luccock disposes them in two classes—the *combing*, and the *carding* wool—which are mutually distinguished by the length of the staple and the mode of manufacturing them: the one being suited to the fabrication of worsteds, and the other to the making of woollen goods. The sheep from which these different kinds of staple are obtained, do not run promiscuously in the same flock, or graze upon the same pastures; each being most commonly found upon its appropriated soil, and under a peculiar management. The line which generally separates them is boldly drawn; though in some few instances the pastures are so mingled, or the qualities of the land so gradually change from those which are suitable to the heavier sheep, as to give the stock a sort of mongrel appearance, and the fleece an uncertain character. But human genius, always fertile in expedients, has rendered even this defect of the fleece advantageous to the interest of society; and has adapted to it the manufacture of stockings.

Thus, although long wool is found in many detached parts of England, it is much more common on the eastern than on the western side, and often nearer to the coast than the middle of the kingdom. Sometimes it is produced upon a few acres which are surrounded by land of a different description, and grazed by sheep of another character; these tracts, being too small to deserve general attention, will be passed unnoticed, and the wool included in the common produce of the district where it grows. Among the larger ranges of long-woolled sheep, the first to be noticed, and the most northern, is situated near the mouth of the Tees, a river separating the bishopric of Durham from the county of York. The second, which may properly be denominated the Lincoln district, comprehends the south-eastern point of Yorkshire, nearly the whole of Lincolnshire, and the fen lands of Huntingdon, Cambridge, and Norfolk. This kind of wool is found in the smaller marshes of Essex and Kent which surround the inlets of the sea, but is much more abundant in those of Romney and of Pevensey. We meet with it in the counties of Dorset, Devon, and Cornwall, upon the Cotswold-hills, in some detached parts of Lancashire, Oxford, Bedford, and Stafford, through the whole of Leicester, Rutland, Northampton, and Huntingdon, and long the banks of the larger rivers.

But it is remarked by Mr. Luccock, that the short wools of the kingdom do not arrange themselves so distinctly in districts as those of a longer staple do, but fill up the whole space besides that which has been noticed as the pasture of the heavier breeds of sheep. Those families which produce a fleece suitable to the card, though originally possessing features much more strongly characteristic than are found in the other kind, are sometimes so mingled with each other, and with the sheep of the larger fleece, as to render it difficult to determine what particular race many of the individuals belong to. Yet it will be found most convenient to describe them in classes, and to proceed from that county where the species appears most pure, to those where its blood becomes intimately mingled with that of another variety. We know not the period when any of these sheep were introduced into the country, nor whence they were procured, but there remain at present in England and Wales, six different kinds of them, viz. the Norfolk, the South Down, the Wiltshire, the Ryeland, the Heath sheep, and the Mountaineer: besides some small collections of different varieties, which seem to have descended from families now almost extinct.*

Only two modes, says Mr. Luccock, have yet been adopted for the improvement of fleeces. "One consists in selecting those lambs for slaughter which have the least valuable coat; the other in bringing into the flock male sheep of the most approved breeds, in order that their progeny may perpetuate their best peculiarities."† It is in fact by the judicious crossing of different breeds with Spanish sheep, that so much has been done towards the amelioration of British wool, and, since this subject has been very ably treated by a neighboring practical writer,‡ we have selected the following important principles, founded on actual experience, for the consideration of all wool growers. They refer, indeed, solely to the improvement of short, or carding wool; but the judicious breeder will readily perceive that they may be equally applied to long-woolled sheep; and a consideration of the facts already recorded must evince the strong probability, that the latter breed will henceforward command superior attention.

1. Every person, who is desirous of having a

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* Treatise on wool, p. 137.

† Ibid. p. 350.

‡ Mr. Fink's Treatise on the "rearing of sheep in Germany, and the improvement of coarse wool," published (in German) at Halle, 1799.

fine-woolled flock, must select the finest rams that can possibly be obtained, particularly at the commencement of his undertaking, i. e. for the first generation; for, if the ram for the second race is finer than that employed for the first, it is evident that time has been lost in effecting the proposed improvement.

2. In like manner, the finer woolled the ewe is with which the improvement commences, so much the more rapidly will that of the breed arrive at the degree of superfine.

3. The greatest attention is requisite that the rams employed for the subsequent breeds be as fine as the first; otherwise the amelioration will be retarded.

4. Where a breeder is desirous of stopping at a certain degree of fineness, without proceeding any further, he may easily effect this object. It will in such case be sufficient to take a ram and ewe of the first or second race: he will have one-half or three-fourths fine; and his flock will retain this degree of fineness without any additional improvement.

5. Unless the breeder be minutely attentive to the selection of his rams, the produce of the cross will have only one-fourth part of the Spanish fineness.

6. If an unimproved ewe be put to a ram of a mixed breed, and which has only one-fourth part Spanish in him, the offspring will only have one-eighth Spanish: by continuing to propagate in this manner, a complete separation of the two breeds will at length be effected.

But Mr. Luccock is of opinion, that flocks might be amended much more rapidly, if, in addition to the common methods above detailed, a kind of barter in lambs were adopted between two neighboring districts, one of them possessing a superior, and the other an inferior breed of sheep. If these could be exchanged in such a manner that the inferior sorts only should be sent to the markets, while the good ones were preserved, he affirms that the British flocks would annually become more valuable; as a few seasons would be fully sufficient to dispossess the least cultivated breeds of their present pastures. Our limits do not allow us to notice the objections which he conjectures may be made to this proposal: but, as it is evidently the result of much reflection and experience, we leave it to the consideration of the attentive reader.

Mr. Bakewell, however, has brought forward some facts and observations which render it probable that the fineness of wool depends upon the *difference of soil.** Having, early on his introduction into the wool business, noticed a remarkable difference in the softness of wool equally fine, but which was produced in different districts, Mr. B. was led to believe "that the herbage of each district derived from the difference of soil some peculiar properties, which gave to it, as the food of sheep, the power of effecting that process of the animal economy by which wool is produced."

"The soils most favorable to this soft quality were, first, the argillaceous; next the siliceous; and it was well known, that calcareous soils, whether limestone or chalk, produce wools of a contrary quality, remarkable for their harshness to the touch. In proportion as the above earths preponderate in a loose state near the surface of different soils, their effects may be detected, whatever be the breed of sheep from which the wool be shorn."*

These remarks on the effects of chalk upon wool, are limited to chalk alone, by Lord Somerville, who considers them as inapplicable to limestone soils in general. "Lime," his lordship observes, "certainly may be burnt from chalk as well as from limestone: as chalk it is conveyed into the fleece by contact in its natural state; but limestone, if it does not lie deep below the surface, as is usually the case, is a hard and clean stone, and can communicate nothing to the wool until it is rendered into lime by the strongest effect of fire. This doctrine militates also against the whole of our practice in the western counties. The pile of all my Merino wool, even of the pure blood, is publicly admitted to be improved; it has been constantly grown on a limestone soil, and the surface of the land manured with lime on each course of cropping, and to the extent of 100 bushels per acre of the best popple-lime, the quality of which has been ascertained by Sir Humphrey Davy, to whom specimens were sent; it has been treated on in his public lectures, and its quality ranks among the strongest of our manuring lime. As the author speaks so positively on the effect of limestone on wools, we may conclude that the limestone of Derbyshire and the adjoining counties does produce this effect."

Mr. Bakewell conceives that the *soft quality* of wool may be preserved in every situation by *greasing the sheep;* and that the same means will also contribute to counteract the effects of climate and soil, where these are unfavorable to this quality; and further, that sheep will thereby be preserved from cutaneous distempers, from the change of climate, and from the sudden change of temperature after shearing. Mr. B. strenuously advocates the practice of greasing sheep, proving its antiquity as well as its usefulness by details of facts, for which we reluctantly refer to his work, as this article would otherwise be extended beyond our confined limits. The result of his practice, however, may be comprised in the following positions, distinct from the recital of facts by which they are supported. Mr. B. infers,

1st. That hair differs from wool, by the greater degree of hardness and elasticity of its fibres.

2d. That some wools resemble hair in this quality more than other wools which are much coarser.

3d. That the hard quality found in some wool, prevents it from making cloth of the same value as the softer wools, if the former are considerably finer than the latter.

4th. That the application of unctuous matter sufficiently soft and tenacious to cover and remain upon the fleece, will defend it from the action of the soil, and is found to produce the soft quality of wool, so desirable to the manufacturer.

Hence the greased wools of Northumberland and Yorkshire possess a superior degree of softness to any ungreased wools in the kingdom.

* "*Observations on the influence of soil and climate upon wool,*" &c. 8vo. 1808. The value of this work is considerably augmented by several important notes communicated to the author by the Rt. Hon. Lord Somerville.

* Bakewell on wool, p. 5.

Sheep that have received the benefit of this practice, and are driven into other counties not remarkable for soft wools, still preserve the distinguishing softness of their fleece. Thus also we learn the reason why ointments, when casually employed to cure some disease of the animal, have also generally been found beneficial to the wool.

If these facts and inferences be admitted, we may also infer, that an improved method of greasing fine-woolled sheep should be adopted in every part of the kingdom, and that it would greatly improve the quality of the wool, and annually save many thousand sheep from perishing by the severity of the weather.*

It has been recommended to besmear the roots of the wool, immediately after the sheep are shorn, with an ointment composed of butter and sulphur, which is to remain on the sheep for three or four days; at the end of which time they are to be washed in salt and water. The advantages stated to result from this practice are—a considerable improvement in the softness and fineness of the quality and also an increase in the quantity of wool produced; besides which the unguent operates as a coat to the animals, and thus prevents them from taking cold immediately after shearing; and also destroys the insects with which they are sometimes infested: a simple washing over with tobacco water will, however, answer the latter purpose.

Too free a use of greasy substances occasions the fleece to imbibe dirt; and although they may not injure the quality of the wool, yet the difficulty of cleansing it materially lessens its price. The opinion that it is of advantage to the growth of the wool may not be incorrect; but it is deteriorated, in a greater proportion than its increased weight, in the eye of the wool-stapler, in consequence of the additional waste and trouble thus occasioned in preparing it for the manufacturer.† Were these objections removed by a proper system of thorough cleansing, and by the use of substances less noxious than fish-oil, tar, and turpentine, it is, however, not improbable that much benefit might be obtained by carefully greasing the pelt after shearing, both in immediate protection from the fly, and in the ultimate improvement of the fleece.

From *British Husbandry.*

ON PUTRESCENT MANURES.

[Continued from p. 564, Vol. III.]

Yards and Sheds.

We have already said nearly all that appears to us to be necessary on the *management of yards*, and the *construction of sheds* for the preservation of manure, in our remarks upon farm buildings,‡ though it may be observed that the former are often so full of large holes as to leave them in many parts saturated with water, or their bottoms are either so porous, or else situated on such declivities as to drain off the entire moisture; in either of which cases the loss cannot but be very considerable to the farmer, although he may be ignorant of what he is daily losing, because it does not go out of his pocket in the shape of hard cash. Whenever a yard is circumstanced in either of the ways just mentioned, all the inequalities should be levelled, the bottom should be rendered sound and water-tight, and if either any declivity in the yard, or the situation of the buildings, occasions the stock confined in it to give a preference to one part over another, the litter should, in that case, be occasionally removed, in order that it may be equally spread over every part, and the position of the feeding-cribs shou'd be altered; for although our opinion inclines to that form which prefers a gentle slope to the centre of the yard, and the dung should be kept moist, it yet should not be suffered to become drenched with rain. If this be not attended to, the excess of wet will prevent the bottom of the heap from rotting; and if it be not regularly spread to a nearly equal depth, the fermentation will be carried on imperfectly, which will occasion those parts where it may have been too much raised to contract an excess of heat, from which they become what is termed *fire-fanged.* This especially applies to stable-dung, which, if allowed to accumulate in heaps without being properly mixed, acquires a mouldy smell, and loses so considerable a portion of the best part of its substance, that its diminution in value has been estimated by a very experienced agriculturist at not less than from 50 to 75 per cent.*

Acting upon the principle of preserving dung, and rendering it immediately available, it has been recommended to construct cattle-sheds, sufficiently capacious to allow a space rather broader than the platform upon which the beasts lie, but sunk somewhat lower, and to which the dung may be swept up. When thus covered, its decomposition is effected by the aid of its natural humidity, and if left for three or four weeks, its fermentation will be completed. The time at which it is subject to the greatest evaporation of its volatile particles will then be past, and it may be immediately carried upon the land. Its quantity will be certainly less decreased, and its quality better preserved, by being left under the cover of a shed, and there will also be a saving of labor in its removal; but not alone should the neatness and order of stalls be taken into consideration, but also the cost. Theoretic people, when advocating new schemes in husbandry, rarely give themselves the trouble of calculating any thing beyond their effects upon crops, without due regard to the expense of their cultivation; and if in this case the additional charges of the erection of the building, together with the repairs, rendered necessary by the steam arising from the dung, were to be reckoned, they would probably be found to exceed the value of the proposed advantages of the plan. While the opinions of practical men on this and other modes of management are so unsettled and discordant, those cannot be deemed imprudent who adopt that side of the question which is the most

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* Bakewell on wool, p. 63.

† See the evidence of Mr. Thomas Cook, of Dewsbury, before the Committee of the House of Lords on the wool trade, in 1828, and the table of comparative prices exhibited by him; from which it appears that Highland laid, or tarred wool, is twenty per cent. less in value than when it is left in its native state.

‡ See pp. 95, 169, and 200.

* Blaikie on Farm yard Manure, edit. 1828, p. 5.

consistent with economy. We will, however, admit that it would be an improvement if reservoirs for the drainage of yards were so constructed that their contents might be pumped up, and sprinkled over horse-litter, whenever its too great dryness occasions any danger of its becoming fire-fanged: for, whether in the yard, or carried out to the dung heap, it should never be allowed to become so dry as to lose the power of fermentation, and if there should be no portion of it sufficiently moist to allow of the dry part being mixed up with it, so as to prevent that risk, it should be sprinkled regularly when shook up. A watering-pot with a large rose will be found to answer the purpose.*

There can, indeed, be nothing more appropriate to the subject than the observation of Sir Humphry Davy, 'that when dung is to be preserved for any time, the *site of the dunghill* is of great importance. In order to have it defended from the sun, it should be laid under a shed, or on the north side of a wall. To make a complete dunghill repository, the floor should be paved with flat stones, a little inclination being made from each side towards the centre: in the centre there should be drains connected with a small well, furnished with a pump, by which any fluid matter may be collected for the use of the land; for it too often happens that the drainings of the dunghill are entirely wasted.'† A sheltered spot of ground ought always to be chosen for the site; and although some after trouble may be saved by depositing it, in the first instance, in the field to which it is to be applied, it is yet, in most cases, found more convenient to place it in some secluded situation near the homestead. 'There it is always under the farmer's eye, and a greater quantity can be moved in a shorter time than when its position is more distant. Besides, in wet weather the roads are not only cut up by driving to a distance, but the field on which it is made may be poached and considerably injured.'‡

These are conveniences, however, that the great bulk of farmers cannot always command; and it often happens that it is necessary to employ the men and cattle in carting the manure to distant parts of the farm some time before it can be spread upon the land. Besides which, it must be admitted to be of much importance, when the turnips are sown, to have the manure ready in the field, as it is then covered in with the least exposure to a burning sun, and the moisture is preserved for the benefit of the crop. In the East Riding of Yorkshire, under 'Farming at Scoresby,' Mr. Howard observes,§ 'as soon as the farm yard is emptied, a quantity of light soil, or road-scrapings, is brought into it; all irregularities of surface are then levelled, and the yard is formed into the shape of a very shallow saucer, being the deepest in the centre. This is immediately covered with litter, and made the general receptacle for potato-tops and waste of every kind that is readily convertible into manure. The manure from the doors of the cattle-houses around it is also occasionally thrown into the middle of the yard, that all may be duly mixed. When carted out it is placed on a layer of earth, and banked up in a compact form, to exclude, as much as possible, both sun and air, and then covered lightly over with another layer of earth on the top. By this means none of its virtues are lost, and the top and bottom soil will mix with, and nearly equal in value, the rest of the heap.' This, indeed, is the common practice of all intelligent farmers, and it is evident that, by constantly putting a coat of light soil into the farm yard when emptied, a considerable addition will be made to the annual stock of manure, as a great part of this will have become saturated with the urine, and will be shovelled up with it whenever it is emptied.

Should there be no perfect and permanent site formed for a complete dunghill repository, accompanied by a well and pump, as above recommended, yet the space intended for the reception of any common dung heap should be slightly hollowed out, leaving one side rather deeper than the other, and cutting a narrow drain through that side, from which any superfluous moisture may be carried off to a yet lower excavation, where it may be received upon a bed of loose mould, or among articles of slow decay, as cabbage-stalks, the tough haulm of over-ripe beans, or any similar substances. It should also be surrounded with a mound dug out from the hollowed place, to prevent water from running into it, and, if that be prevented, no danger need be apprehended from any excess of moisture, except in times of very heavy rain, which, in such seasons, can also be much guarded against by sloping the sides. Were roofs constructed over dung-hills, to protect them from the rays of the sun, as well as from rain, there can be no doubt that, if roughly put up, at little cost, they would prove advantageous; but the benefit should be always closely estimated, in order that it may not exceed the charge: perhaps a contrivance of the kind might be made with spare branches of trees, and worn out hurdles, supported by posts formed out of any otherwise useless timber.

Preservation of dung.

Practice differs in the modes adopted respecting the *care of farm yard dung*. Most farmers allow it to accumulate for a long time in the yard, adding fresh straw regularly to the heap, from an impression that the bottom, if unremoved, will become the richest part, and that its accumulation imparts a certain degree of warmth to the cattle; while some recommend 'that it should be cleaned out once a month at least, not only to sweeten the yard, and thereby to increase the health and vigor of the animals, but in order that its contents may be properly mixed in some other place, to induce and bring on a regular fermentation.'* Now, on this it may be observed, that the fears which are entertained by some persons of the vapor arising from dung which is contained in the open air of the yards becoming prejudicial to the health of the cattle are proved by experience to be completely

* General Report of Scotland, vol. ii. p. 523.

† Elements of Agricultural Chemistry, lect. vi.

‡ Brown, of Markle, on Agriculture, vol. i. p. 372.

§ Report of Select Farms, No. 5, p. 27. See also Middleton's Survey of Middlesex, second edition, p. 377.

* Malcolm's Modern Husbandry and Survey of Surrey, &c. vol. ii. p. 8.

visionary. No really bad odor prevails there; for, although it may be offensive to delicate nostrils, the air is always respirable, and when not confined in close stalls, by which the circulation is prevented, no ill effects are ever known to arise from it. But when the cattle are either fed upon turnips or other green food, the quantity of urine which they discharge drenches such a quantity of straw, that the beasts cannot be easily kept dry; or if they be crowded in badly-arranged yards, and immersed in the filth proceeding from a scanty covering of straw, and the want of proper drains to carry off the superfluous moisture, they may then indeed be exposed to injury from it; and the dung should be removed, though in almost any case 'once a month' would be a sufficient interval. In many instances the yards are never cleaned out until the cattle are turned out after the close of the winter; and, unless in a very plentiful season for straw, it is seldom done more frequently, after they are shut up, than perhaps once or twice in the early part of the spring; except they be soiled during the summer, in which case it becomes frequently necessary. When proper care has been used to prevent an excess of rain-water, the manure thus obtained from the bottom layer will doubtless be found of superior quality; but the whole heap ought to be well mixed, in order to render it of equal value.

An eminent agricultural author, whom we have already quoted, complains that he has not, in any one instance, been able to find any thing like system in the mechanical management of the component parts of farm-yard mixens, which he generally found put together as they arise, according to circumstances, and without any regard to rule. Hence it follows that their real value as manure can never be distinctly known to the farmer, nor can he apply that proportion which a more accurate knowledge of the contents would enable him to apportion to different kinds of grain, or to the particular soils and seasons in which they can be most advantageously applied. A heap, for instance, composed entirely of dung from stables where horses have been plentifully fed with corn, must be far superior to one produced by cattle in the straw-yard; yet so little is this very material point adverted to, that nothing is more common than to hear of 'so many loads per acre' being laid upon the land, without regard to the ingredients which it contains, though nothing is more certain than that its power over the crops will be in exact proportion to the qualities of the materials of which it is composed.*

This writer advocates the separation of the various species of manure, in order that the properties of each may be distinctly ascertained: yet another author, of equal experience, says, in treating of Norfolk, 'that the principal error in the common method of manufacturing farm-yard dung originates in the prevailing custom of keeping the dung arising from different descriptions of animals in separate heaps or departments, and applying the same to the land without intermixture, and consequently in an improper state.' He then alludes to the difference arising in the manure from the modes of keeping fatting and store cattle in yards by themselves, 'while horse-dung is also usually thrown out at the stable-doors, and there accumulates in large heaps, which very soon ferment and heat to excess;' he therefore recommends that litter be spread over the straw-yard, and the whole of the dung from the different yards and the hogstyes to be mixed together.*

On these opposite opinions we have to remark, that, when either the soil or the intended crop is essentially different, it may be very desirable that the manure to be employed should possess distinct properties, and that some, in such cases, a portion of it should be separately kept, as well as differently treated. Thus warm and cold soils require manures of a contrary nature; an advanced stage of their fermentation is in some cases less adapted to vegetation than in others; and, in the case of potatoes, it is well known that stable-dung is employed with more effect alone than when mixed. It may, therefore, be advisable that horse-litter in particular should be separately kept in the yards, not merely for the purpose just mentioned, but that, as being of a hotter nature than any common dung, it may be mixed with that of other cattle in such proportions as may be thought best adapted to the purposes for which the compost may be required. If no better arrangement can be made, the litter should be placed within some dry ditch, which will answer the purpose of a more regularly constructed pit, where its moisture may be maintained without too greatly heating it, and without exposing it to the evaporating action of the air. Thus, if care be at the same time taken to prevent it from becoming dry, the fermentation will be checked; and should it be thought expedient to still further retard that operation, it may be effected by a mixture of hog's dung, which, though rich, yet being of a colder nature, is less fermentable. By this union the dung becomes decomposed into a soft and pulpy mass, which forms a very powerful manure, and, by a little judicious management, can be either promptly got ready or be kept back at pleasure.

Under other circumstances, however, and especially on small farms, where the quantity of materials may not be sufficient to allow of their being separated without incurring the risk of loss by the excess of evaporation, or by the want of due fermentation, it is found more generally expedient to spread together all the different sorts of the dung of the larger animals in different layers, so that each may be regularly mixed and partake equally of the common properties of all, by which means the faults of one species are corrected by another; the too rapid fermentation of the dung of horses is checked, while that of hogs and horned cattle is accelerated, and thus the whole mass acquires the enriching properties of the most fertilizing compost.

Preparation of manure.

Dung, thus indiscriminately thrown together, being composed of every species, whether from horses, pigs, or black cattle, bedded with a little of straw and haulm, to which every vegetable substance that can be collected round the house and premises should be added, forms a combination of fermentable matter of various kinds, which, with

* Malcolm's Modern Husbandry and Survey of Surrey, &c., vol. ii. p. 3.

* Blaikie on Farm-yard Dung, edit. 1823, pp. 3, 5, 6. See also the Nottinghamshire Report, p. 163.

due care, may soon be brought into a fit state of preparation. Instead, however, of laying it in a regular manner, it is too often suffered to remain in different heaps, in whatever part of the yard it may have been carried from the barn and stables, in which condition it is left during the winter; and being thus imperfectly fermented, its value is, in all such instances, very materially injured: whereas, if spread as equally as possible over the entire yard, the different materials becoming thus well mixed together, their different properties are blended, and a compact mass of manure is produced of equal quality.

It should, however, be observed, that there is in every farm-yard a proportion of hot and pungent dung, produced by poultry and pigeons, which should be separately kept for top-dressings, for which purpose it may be found very useful: if scattered over the common heap, it will, however, have the effect of increasing the fermentation and hastening its decomposition. That of swine, also, when thus mixed, has the same effect; and it was proved, after repeated trials, when the temperature of the air was 40° of Fahrenheit's thermometer, that of

Common farm-yard dung was about	-	70°
A compost of lime, dung, and earth	-	55°
And a portion of swine and fowl's dung		85 °*

Care should also be taken that, if any other substances than those commonly employed be added to the heap, they be of such a nature as will render them equally susceptible of decomposition; if not, a small quantity of quicklime will have that effect; but it should be applied separately. Lime should also be added to all weeds which have ripened their seeds, as well as to the roots of docks and other noxious plants, which long retain the power of vegetation, and spring up when laid upon the land, unless they are destroyed. The better way, indeed, is to place them in a spot away from the yard, and mix them into a compost, as will be hereafter mentioned.

On what has been said respecting the *removal of dung and litter from the farm-yard*, it should also be remarked, that there being retained during a long time in the yard is consistent with the comfort of the cattle and the due preparation of the manure; for if straw be added in sufficient quantity to keep the former dry, although the lower layers of the manure may be in a good state, yet those at the top cannot. Straw, flung out to the yards in considerable portions, becomes, after being compressed by the trampling of cattle, rather like a well-packed stack than a mass of dung in a good preparatory state. Except where a considerable stock is soiled, the small quantity of urine and dung made by the animals is barely sufficient to cause a slight fermentation in the heap, which brings on fire-fanging after which its original powers can rarely be restored. To prevent that injury, no measure can be so successfully used as a frequent removal of this unmade dung, especially if the weather be wet at the time; for there is in such cases so much straw that has not passed through the entrails of the cattle, as renders it almost impossible to do injury by an excess of moisture:† if, therefore, its removal be deferred to any distant period, a proportionately greater length of time must necessarily be devoted to its turning and being got in order for the field. Unless over-year muck be used, if the manure be required for turnips, it will be found necessary to lead it from the farm-yard as soon after Christmas as the weather and the state of the roads will admit of it; or, if wanted for beans, that should be done much earlier. No period is more advantageous for this work than a frost; and if much manure is wanted early, it may be led from the yard a second time in the month of February. It should not be forgotten that the lighter it is laid upon the heap, the more rapid will be the decomposition; and that it may be retarded by compactness of form, and pressure on the top with a heavy coat of soil. This, however, must depend upon the quantity of litter and of cattle, of the extent of the yards, the state of the weather, the condition of the manure, and the intention to which it is to be applied—all varying according to circumstances, for which no precise rule can be laid down, and which must therefore be left to the judgement of the farmer. Yard dung, made in winter, if trodden by cattle, will not be found to ferment much. It ought, if possible, to be kept neither too wet nor too dry; if in the former state, it will injure the stock, without forwarding its own decomposition; and if in the latter, it will become mouldy, or fire-fanged, and lose its most valuable qualities: in order to prepare it in the best manner, it should therefore be preserved in a mean between the two extremes.*

Throughout most countries the general plan is, after foddering is over, to carry out the dung from the farm-yard, and to place it in large heaps, in order to occasion a due fermentation, and to render it quite rotten before it is laid upon the land. There are, however, many circumstances which render practice and opinion at variance on this point, in consequence of which a great portion of the manure is carried directly to the fields, and applied to the intended crop, either fresh, or perhaps after being once turned over. The apprehension that dung loses much of its virtue by evaporation is not entirely unknown or unattended to; but people think differently on the subject. Several farmers maintain that ploughing in the manure as soon as it is laid upon the land is unnecessary, if not injurious; because they say that it absorbs the nightly dews and other substances from the atmosphere, by which its quality is improved; that the rain will wash in the salts, while the sun only exhales the water; that, when spread upon the surface, the soil also thus becomes gradually impregnated with its juices; and that clay land in particular is rendered mellow and free to plough. Thus with many it is the practice to carry out yard-dung in its long and hot state, and to suffer it to lie both upon arable and grass land for perhaps a month or six weeks after being spread, before it is ploughed in, though it is acknowledged to encourage the growth of twitch and other weeds.† Others cover it, or, as it is termed in Norfolk, 'scale it in,' with a slight coat of mould. On the other hand, although the process of fermentation by disengaging a quantity of carbonic acid and ammonia,

* Farmer's Magazine, vol. xiv. p. 160.

†Brown, of Markle, on Agriculture, vol. i. p. 375

* East Lothian Report, p. 158.

† Buckinghamshire Report, p. 273; Norfolk do., p. 171.

causes an evaporation, by which the bulk of the manure is much diminished, yet its power is thought to be thus increased. This apparent diminution in bulk has indeed been too much insisted on by the opponents of rotten dung, as proof of its decrease in value; for, although the size of the heap thus evidently becomes smaller, yet its cubical contents are, by its condensation, increased in weight.* After about six weeks it assumes a saponaceous, greasy appearance, in which soft and sappy state, when neither fresh nor too rotten, but in the medium between those states, it is generally applied to the land by the best farmers. When very rotten, its effect is more immediate and powerful; but when only moderately rotted, its effect, though more gradual, is found to be more durable.

On this *subject of evaporation*, which has justly engaged so much of the attention of scientific agriculturists, we, however, add the following extracts from the work of Von Thaër, whose practical knowledge cannot be too highly appreciated. He says, that not only does theory teach us, but during his own experience he has had frequent occasion to observe, that it is hurtful to remove farm-yard manure while it is in a high degree of fermentation; for, according to all appearance, an essential portion of the most active substances of which it is composed are evaporated when exposed to the air while that process is going on. But, before the fermentation has arrived at its height, or after it has passed, the dung does not seem to lose anything by exposure to the air; or, at least, nothing but what it regains by some other means.

That an evident advantage attends the spreading of fresh strawy dung upon the surface of the soil during the winter, and leaving it there in that state until the spring ploughing (it being, at the same time, well understood that no declivity of the land allows of its being washed away by the rain)—for this method of covering the ground occasions it to absorb the juices of the dung, and thus renders it not only friable to work, but extremely productive: so much so, that the straw has been afterwards raked off the land at the close of the season, and yet the soil has appeared as much improved, as that in which the whole of the litter had been buried—an effect which is also apparent in meadow ground which has been similarly treated. Not alone has this occurred in many such instances; but in others, in which both long and short dung have been spread upon land already sown with tares and peas, and though left there during vegetation, have produced the most beneficial effect upon the crops, especially when sown late, and applied to ordinary land of a light and warm nature: but what appears more extraordinary, and difficult to explain—the land which has been thus managed has evinced a decided superiority in the subsequent crops over ground on which even a larger quantity of dung had been regularly ploughed in.

That, as one proof of this, in the spring of 1808, rape was sown along with clover upon a poor soil, and was afterwards covered with fresh dung: in the autumn of 1809, the clover-ley was broken up, and rye was sown; the crop of which in the following year was distinguished by its superiority over that of an adjoining field which had been dunged upon a summer fallow. Indeed, after a number of comparative experiments, made by himself as well as by other farmers, it appeared to him beyond all question—however incredible it may seem to those who have not also tried its effects—that dung which has already passed the extreme point of fermentation, not only loses nothing by being exposed upon the land, even during the summer, but even gains. The evaporation may, indeed, be not so great as it is generally supposed; for although it is true, that when the dung is carted out and spread, it then effects the air with a strong musky smell, yet there is no mode of avoiding that: and even if there were, the vapor which is thus diffused is so tenuous, light, and expansive, that doubts may be entertained whether the quantity of sap which is thus evaporated can be very considerable, as, after a short period, the dung does not exhale any odor. According to the experience of M. Thaër, it does not lose in weight; and he remarks, that, if laid during a few weeks upon a summer fallow, a number of young plants of a very vivid green will be seen to spring up, even upon spots which have not come into contact with the dung; which proves that its fertilizing properties were spread around, even before it had been buried in the soil.*

We have thus entered at large into this discussion, because we consider it important to throw every light upon the subject of which it may be susceptible; and it besides contains some strong reasons for the application of long dung.

There are, however, many farmers who persist in the use of *over-year muck*, or that which has been kept perhaps a twelvemonth, or more, until it is completely reduced to a pulp, in which state it is very commonly applied to turnips. It thus loses

* The weights of putrescent manures will depend much upon the progress of their decomposition at the time, as well as the proportion of moisture which, from accident or particular treatment, they may contain. From an experiment on the subject, recorded in the Farmer's Magazine, we learn that the comparative weight of the following substances was as follows:—

	cwt.	qr.	lbs.
One cubical yard of garden-mould	19	3	25
Ditto of water	15	0	7
Ditto of a compost of earth, weeds, lime, and dung, that had lain nine months, and been turned over	14	0	5
Ditto of new dung	9	3	18
Ditto of leaves and sea-weeds	9	0	7

Thus a cubic yard of water is to that of new dung nearly as 3 to 2.—vol. xiv. p. 162. Von Thaër calculates the weight of a cubic foot of any strawy farm-yard manure at only about 46 lbs.; while one which has been partly decomposed will weigh from 56 to upwards of 60 lbs. without being compressed. *Principes Raisonnés d'Agriculture*, tom. ii. p. 328.

* Principes Raisonnés d'Agriculture, tom. ii. p. 315, §690. It is difficult to ascertain the precise degree of evaporation arising from fresh dung; but, by an experiment made by the Rev. St. John Priest, Secretary to the Norfolk Agricultural Society, in the presence of Mr. Curwen, of Workington, it was found that steam was evaporated by a piece of moist ground held under a large glass during a quarter of an hour, in the month of October, at the rate of about 1½ cwt. per acre. Survey of Buckinghamshire, p. 271.

This indeed, appears a large amount within that space of time; but, had the experiment been longer continued, it would have been much diminished, and would, no doubt, in a short time, have entirely ceased.

perhaps half its bulk; but it is considered peculiarly favorable, and even necessary to the growth of that crop, as its power upon vegetation forces it so rapidly as to put it promptly out of the reach of the fly.* When, however, the process is carried too far, and the manure has been frequently turned—until, as said by some farmers, "it [illegible] becomes *flesh stuff*," it has then, indeed, been found so completely deprived of its nutritive qualities as to produce no effect whatever upon the land. On the whole, there is reason to believe that there is, in the management of dung, as in all other cases, a certain point which constitutes the [illegible] of profit, beyond which there is nothing [illegible].†

The *management of* [illegible] light and heavy soils, [illegible] the use intended to be made of it; [illegible] rally employed in different [illegible] and [illegible] different crops. For light [illegible] the most common crop in the commencement of [illegible] tation is usually turnips, it requires to be [illegible] fermented; because, if not [illegible] with the ground in that soft and [illegible] state in which good spit-dung ought to be, the plants will not receive such immediate nourishment as will serve to push them into rough leaf before the attacks of the fly. But for clays and other strong soils generally, whether the manure be applied to fallow under preparation for an autumn sowing of wheat, or in the early part of the spring for beans, as it has a longer time to decompose in the soil, a less degree of putrefaction is necessary than for turnips. Potatoes, also, though grown on light land, may be raised by the use of fresh unfermented manure, because they do not require the same nutriment as turnips during their earlier growth, and because they are also supposed to be assisted by the action of long dung in opening the soil.‡

When, therefore, a farmer looks chiefly to a prompt return through immediate benefit to the next crop, the manure should be thoroughly rotted to the condition of spit-dung; "but if his views extend to subsequent crops, or if the soil be of a nature to receive benefit by the fermentation and heat produced by the application of long dung," then it has been affirmed "that preference should be given to that in a fresh state, provided it be immediately ploughed in and totally covered."§

This, however, although the opinion of the author whom we have just quoted, as well as that of several eminent practical men, should yet be received with a certain degree of caution; for besides the objections already stated to manure of this description, there is such difficulty in ploughing in the straw, that much of it is necessarily left upon the surface of the soil, where its virtues are in a great measure lost; or, if buried deep in cold and retentive clays, it becomes locked up in the earth, and its fermentation is prevented. In order to bring it into such a state of decomposition as we have already stated, the information which we have collected on the subject may be thus condensed.

On most farms the *yards are commonly cleared* towards the [illegible], or the latter end, of April; [illegible] prevent the work [illegible] during the winter, [illegible] of the manure in succes- [illegible] may however be done, [illegible] is the most advisable method of pro- [illegible].

[illegible] is to carry out the dung [illegible] either to some waste spot adjacent [illegible] the field to which it is [illegible], and there to leave it exposed to the weather, without any other preparation than [illegible] over, or, if it be completely rotted, or [illegible] such time as it may be thought requisite [illegible] the land. The better plan, however, is [illegible] a bottom for the dunstead, consisting of [illegible] of clay or sand, ditch and road scra- [illegible], or any similar substance, which must [illegible] and pulverized, and then spread to [illegible] length and breadth which it is sup- [illegible] will cover, and from a foot to 18 [illegible] raised at the sides and sloped [illegible] so as to absorb the liquor which [illegible] the dung during the heating and putrefaction which always take place while it lies in [illegible]. The yard dung is then carted out, and shot upon the bottom; one end of which is at first left lower than the other, in order to render the ascent easy to the cattle—a practice, however, as we shall afterwards see, which is not always to be commended. It is then thrown slantingly up until the heap rises to four or five feet above the foundation; after which careful farmers raise a coating of the same materials as the bottom, a couple of feet in thickness, which is spread round the heap to its full height; or, when the mixen is raised upon the field in which it is intended to be applied, the soil may be ploughed around the heap, and plastered or faced up against the sides by the back of a spade. The dung is then allowed to duly ferment, which may be seen by its sinking, and easily ascertained by thrusting a few sticks, of the common size of broom handles, into different parts of the heap, as well as by its steaming and offensive smell, which, however, subsides when it is thoroughly decomposed. Dark-colored putrid water is also drained from the heap, and there can be little doubt that this discharge of vapor and fluid will, if permitted, occasion the loss of some portion of the virtues of the manure; in order to guard against which, a thin coat, of the same kind as the sides, and made as fine as possible, is laid regularly and lightly over it, so that its weight may press equally, and not heavily—for, if left in lumps, their cumbrous weight would force the dung into holes, and prevent its regular fermentation.

By this covering of the dung with a due proportion of earth, or of other coating, that loss is

* Young, indeed, says, "that long stable-muck has been carried out from turnips in March, without any stirring, and that the crops were as good as from short muck, though the growth of the plants was not so quick; but then 15 loads of the former were laid on instead of 12 of the latter. Long and short dung have also been mixed together, and laid upon strong land, with good effect. It was carted from the yard late in the spring, forming heaps, which in three weeks were turned over, and, within a fortnight more, were laid upon turnips; but the practice is not common, nor very likely to be generally followed.—Norfolk Report, chap. xi. sect. iii.; Essex do., pp. 222, 240.

† Surveys of Bedfordshire, p. 506—508; East Lothian, p. 159.

‡General Report of Scotland.

§ A Treatise on the Connexion between Agriculture and Chemistry, by the Earl of Dundonald, p. 98.

however in a great measure prevented; and the bringing of the heap into a state of preparation either sooner or later, as circumstances may require its application to the land, can be effected by the denseness and compression of the covering. The operation therefore requires considerable delicacy; for, if dung, already in an unfermented state, be so closely pressed as to effectually exclude the air, it will be found, perhaps at the distance of several months, in a state very little different from that in which it was put up; or, when it is thought to be in a perfect state of preparation, it will, upon examination, be discovered to be only decayed, and, instead of abounding in rich unctuous substance, to consist almost entirely of mere vegetable earth.

This also leads us to remark on the common practice of *driving carts, with their loads, upon the dunghills;* the consequence of which is that, as nearly the same road is followed by each cart in crossing them, it is not possible to draw load after load upon such a heap without compressing those parts where the horses tread, and thus, instead of the dung undergoing a regular fermentation, which every part necessarily would if it had been thrown loosely on the heap, and of one uniform thickness, it is, in some spots, consolidated into a mass which, in most instances, greatly retards, and in some entirely prevents, the process; "becomes mouldy from want of air, caloric, and moisture,—acquires a musty, turbid smell,—generates fungi—and is, in that state, injurious to vegetation."* The system has indeed been defended by some very able men, one of whom insists "that the dung should be drawn out of the yards, and placed upon the bottoms, though not in the usual way of throwing it up loosely, to cause fermentation, but, on the contrary, by drawing the carts, with their loads, *upon the heaps*, for the purpose of compressing the dung, and thereby *preventing fermentation;*"† and another conceives that "a positive benefit will be gained by this slight compression."‡

This difference of opinion may however have arisen from attention not having been paid to the different qualities of the dung, as well as to the use intended to be made of it. When the materials removed from the yard consist chiefly of litter in a fresh or rough state, not sufficiently saturated with the urine of cattle, or when the manure is not intended to be immediately applied to the land, no serious damage can ensue from driving the carts—which are usually drawn by one horse—across the heap, when the dung has risen to some height upon the foundation; but if that operation be performed before some considerable portion of the dung be laid on, the inevitable consequence will be that the bottom, which consists either of earth or of other matter devoid of elasticity, will thus be kneaded into solid and unequal lumps, which will occasion the effect complained of. Care should therefore be taken to make the heap so narrow, that by driving on each side of it, the carts may be backed, and the dung shot upon the pile, which may then be levelled with grapes, or forks, and laid compactly together. Much labor of the teams will thus be saved: if the object be to prevent fermentation, the dung may be regularly and closely trodden down by the men employed in spreading and levelling it; and the quantity of earth to be laid over it may be regulated accordingly. If, on the other hand, the manure be intended for immediate use—then the dung should be thrown lightly together without treading, and the quantity of earth on the sides and top should be reduced; or, if the dung be of a hot nature, from which too sudden or violent fermentation may be apprehended, a portion of the earth may be intimately blended with it, and it will thus be soon brought into a fit state for application.

It must not, however, escape observation, that store cattle are often kept in straw-yards apart from other stock; or else that, when the same yard is used, the stable-litter of horses is thrown separately out, and thus produces two very distinct species of dung. Attention should therefore be paid, in clearing the yards, to take a few cart loads from each kind alternately, so that the whole may be, as nearly as possible, equally mixed, and heat alike. It will thus also be seen if any portion of the dung is too dry, in which case it should be distributed among that which is wet; and if there be any general deficiency of moisture, or if the external parts of the heap become dry during the process of fermentation, they should be thoroughly wetted. The heaps, too, should be of moderate size, by which means they can be turned and got ready at different periods, as occasion may require.*

These *pies*—as they are provincially termed when thus crusted over—if ready by the 1st of May, may be reasonably expected to be in a fit condition to be laid on the summer fallows by the latter end of July, though the time required for their preparation must be governed by the strength of the dung, the weather, and the exact period of its intended application. Those formed during the summer months, unless the dung be produced by horses and cattle kept in the yards by soiling on green food, can seldom be collected and got ready for use within the same season: but when intended for turnips, the manure should be carried out and lightly raised about six weeks or two months before it is wanted, with-

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*Malcolm's Compendium of the Modern Husbandry of Surrey, Kent, and Sussex, vol. ii. p. 5.

† Blakie on the Management of Farm-yard Manure, edit. 1828, p, 13. See also Sinclair's Code of Agriculture, 3rd edit. p. 218.

‡ Brown of Markle, treatise on Agriculture and Rural Affairs, vol. i. p. 275.

*On this subject, Mr. Coke is said to have lately expressed himself, at a public dinner in Norfolk, to the following effect: "Having made a platform of marl, I placed the inferior muck upon it; the manure of the fat cattle formed the third coating, and upon that the horse-dung as the fourth, and in about equal quantities. I then ploughed round it, threw up the earth, and made a kind of coating over the whole, to keep in the gas. Just before sowing, the heap was turned over; and thus, when the muck was in a state of fermentation, it went into the drill. Let farmers follow this plan, and give plenty of seed, and they will not find their crops of turnips to fail; the warmth of the manure would force the turnips out of the way of the fly in less than eight-and-forty hours. In Dr. Rigby's account of Holkham, it is also stated that, by preparing manure in this manner, Mr. Coke saves no less than 500*l.* per annum in the purchase of rape-seed as a top-dressing.— 3d edit., p. 56.

in ten days or a fortnight of which time it should be very carefully turned.

The *operation of turning* is also one that requires circumspection. This is often neglected until the heat of the mixen is quite spent, its fermentation passed, and it has become entirely rotten. To which glaring error is to be added the carelessness employed in that labor by servants, who, in turning it over, usually begin at one end, and throwing layer upon layer as they cut them through, place them again in the same order in which they found them, with this only difference, that the part which was at the top now becomes the bottom. Thus it has been justly observed by Mr. Malcolm, that 'benefit which might have accrued to each ingredient by the proper admixture is infallibly lost, because the dung has been prevented from infusing any of its saline particles into the mould, and when laid upon the land, instead of being a body of invaluable manure, they are little better, as such, than as if each ingredient had been immediately drawn from the beds out of which they were originally taken.'* All this may, however, be easily avoided by cautiously observing the probable state of the fermentation of each heap, and by turning it completely over either when it requires lightening or pressure; by narrowly watching the process, so that every part may be thoroughly shaken up, the clods and lumps in the bottom, top, and sides, well broken, the adhesive parts of the dung separated, and moisture added, if necessary. When this process has been attentively performed, it has been recommended by Mr. Blaikie 'to immediately plough several furrows of the natural soil all around the heaps, and with the loose earth ploughed up again coat the heaps all over: the pies will then take a gentle fermentation: the earth intermixed with, and covering the dung will absorb the juices and gasses of the dung, and the compost will come out in a fine state of preparation for using on turnip land.'† From manure of this description, in which all the materials are intimately blended, soaked with putrid water, and decomposed to a degree of mellow consistence; different sorts, to suit different soils and crops, cannot indeed be taken; but perhaps, with the single exception of potatoes, this one sort of farm-yard dung, managed as above, may be successfully applied to every crop, and to every kind of soil.

[To be Continued.]

*Compendium of Modern Husbandry, vol. ii. p. 6.

†On Farm-yard Manure, edit. 1828, p. 15.

"FACTS" AS TO FEEDING WORK HORSES AND MULES. REMARKS ON MANAGEMENT THAT IS NOT UNUSUAL.

To the Editor of the Farmers' Register.

Charlotte County, Va.,
New Year's day—1836.

Your call for "facts" in one of the back Nos. of the Register has not received the attention from correspondents that it really deserves. Were I disposed to find fault with your paper for any thing, it would be, that so little is said about *facts*—even in the small way noticed in this communication. I was glad to see *your eye* directed to these things, and would be still more rejoiced to see your columns enriched with those things called *facts*—for you know they are stubborn things, and cannot be gotten over.

First then, let me state a few that have fallen within my observation—perhaps others more useful may be elicited from the bare mentioning of these. That I should make a short crop of corn twelve months ago last July, was a *fact* so plain to be seen, that my overseer was directed to suspend our *old practice* of giving the work-horses corn three times a day; and having only a moderate crop of oats, he was also directed to shorten his usual allowance of this most excellent and perhaps the very best of food. His reply was (to use his own expression, and I believe a common one) "the teams can't be kept up on so small an allowance." However, the fact was, my prospect for corn forbade a compromise—accordingly we went to work with the determination to do the best we could—(which was not to buy corn.) My teams amounted to four horses and two mules. My stock in trade, at gathering time, was about fifteen barrels of old corn, and ninety barrels of new—ten stacks of oats—ten of hay, and a few bushels of wheat—a small stock of hogs, &c. &c. My family numbers about two dozen eaters. About eighteen months have now elapsed, and I have just commenced on my crop of new corn—nearly the whole of my last crop of wheat yet on hand—all of the oats, and nearly all of the hay now in the stacks—my family in good health—the teams and stock as fat as any in the neighborhood—and all things promise to move on as usual. But it will be asked "how was this done? Surely the horses, and *poor Cuffees* especially, had a hard time of it. This was abolition with a vengeance," &c. &c. Well to the law and testimony.

My practice, as to feeding the "poor Cuffees" was as it always has been, viz: three and a half gallons of meal per week—three pounds of bacon, with what few vegetables could be had from a very poor garden. The horses were fed principally on oats, so long as the ten stacks lasted, which was until the last of April—sometimes a little hay or fodder, and occasionally the addition of five ears of corn; but until last June, I think, it was positively against orders that a horse should have even that. When we commenced "laying by" corn, (which time is here considered the hardest of the working season,) they were allowed five ears of corn at each feed; this lasted not more than ten or fifteen days—for as soon as it was practicable to cut clover, we gave to each horse as much as he would eat in a green state: after the crop of corn was "laid by," my horses never so much as tasted corn, until here lately we begin again to give five or six ears at a feed. They were fed on clover alone as long as it was fit to feed in the green state—then it was given well cured. But, Mr. Editor, a *fact* worth recording, is, that my mules for the space of sixteen months never knew what corn was—eight months of which time they were kept up on clover alone. Were I to have mules the balance of my days, they should never see corn again—unless in a freak of good nature I might allow them to sweeten their palate, if any they have, with an ear or two of good sound corn. The crop made under this management was equal to, or better than my usual crops. One of my neighbors being in the same predicament, followed suit—his teams having been kept up on green clover pretty much in the same way; and were I permitted to offer advice to you or your readers, it would be, to save *one-half* of your corn by a course of management somewhat like this. Now this is saying a good deal for clover. Can as much be said for any other grass? Can as much be said for herds grass?—against which, except as a meadow grass, I have declared war ever since 1825.

It has been said, "the master's eye is half fed." I have never felt the truth of the remark so forcibly illustrated, as in the facts above mentioned. Instead of *telling* the ostler to feed well and curry well, my plan was to rise rather earlier, and walk to the stable, where every thing like negligence and inattention might at once be corrected. At 12 o'clock, instead of lolling on the bed, or taking a seat at the chimney corner with a pipe in my mouth, the same thing was repeated. Thus, by attention and regularity, we all had bread enough, and our horses are in good condition. There is another thing about our teams, too much neglected, which merits severe reproof, and is as shameful and scandalous a practice as it is barbarous and ruinous—I mean *gearing* the horse. How often do we see horses, belonging to the wealthy—aye! *humane* farmer, not only rubbed until it becomes a difficult task to say whether they have been in the hands of some unskilful barber, or forced through a brush fire—but with shoulders and backs as raw as a piece of fashionable beef-steak. What else, Mr. Editor, can we expect—for if you will examine the collars, perhaps half has been eaten up by the more than half-starved cattle—the balance carefully wrapt around the poor animal's neck. Instead of a good substantial hamestring, made of leather, you will find nothing but an old twisted hickory-switch; with the but end probing a sore of some months' standing. Look, sir, at the traces. Link after link has given way, until you can hardly say which of the two is most in need—the carpenter or blacksmith. And as for back-bands or belly-bands, the poor animal is corded up with grape-vines or elm-bark, until he can scarcely draw a comfortable breath. These things are *facts*—whether they are worth the trouble of recording in the Register remains for you to decide. And there are many other facts which might be mentioned like those already stated, but I must forbear, least a complaint be heard from some of your readers. So I will conclude, with the addition of one more—though last, not least worthy to be noticed—that is, if you are scarce of horse provender, feed with a sparing hand in the fall and winter. As spring comes on, deal out more liberally—for during the sound healthy weather of fall, as well as the cold short days of winter, a horse will endure more fatigue, with less food, than he can possibly sustain in the relaxing months of spring, or still more parching sun of a summer's day. There are farmers about here who have the reputation of being good managers, whose horses are always fat and sleek in the fall—but rough and bony in the summer; this should not be, and like some of my friend's proverbs, makes another "great evil under the sun."

W.

[It is to be regretted that our correspondent should have deprived his statement of very important facts of half their value, by withholding his name—for this is the certain consequence of the use of a fictitious signature to all readers who have not the advantage, (which we possess, in this case,) of knowing the high respectability of the source whence the information proceeds. But in this respect, we must be governed by the will of the correspondent.

The minute statement given above, shows more fully than we had supposed—though long satisfied of the general fact—that we feed horses generally at much more expense than is necessary to preserve their health, flesh, and strength. But this fact, however valuable, and however well established, can only be made proper use of by a farmer who attends as closely to the feeding, as our correspondent, (or who has the rare good fortune to have an overseer who will pay the same attention to his interest—) and who also has a largesh are of that *horse-knowledge*, which seems to be a natural quality, and no more to be acquired, than a talent for painting or poetry. The phrenologists have placed no such organ as this in their list—but if there was any truth in their system, they would doubtless have discovered on many human sculls, and especially in Virginia, a bump showing the love for, and knowledge of horses. Of such an organ, however, we must confess our entire destitution, as well as of the system of good management which might compensate for its absence—and consequently, like the greater part of our fellow farmers in Virginia, our stable *mis-management* has been not very unlike such as our correspondent describes in the latter part of his letter. Though long sensible of the waste and impropriety of heavy feeding, we had no other safeguard against still greater injury to horses and mules, if their food was ordered to be reduced below what they would consume and destroy. If W. was our neighbor, we should have suspected him of designing to include our farm in his general description. This *egotism* may be excused, because our errors and losses in this respect, are the same with thousands of others, who are compelled to manage through ignorant or unfaithful agents. Though amply provided with clover, and desirous to use it as green food, we have never been able to do so to any considerable extent for working teams. Though cut a day before being used, the overseers would declare that the horses would "give out," upon even a part of their abundant food being green—and as they can always assure the fulfilment of their prediction, the proprietor must yield. When there is no scarcity of corn, our horses are generally both over-fed and over-worked: and the consequences are, that the excess of food serves to impair the health and strength of the animal, and the 12 or 14 hours work in a long summer's day, amounts to less than 10 hours would give, with rest the balance of the time.]

THE RIGHT OF COMMON AS ESTABLISHED BY LAW.

To the Editor of the Farmers' Register.

Fairfax County, Jan. 8th, 1836.

Since the General Assembly determined that it was not good or right to protect real estate and give it the same inviolable character that all other property receives, I have thought it a folly to talk or write about improvement. For, sir, who will or can be such a fool as to take property that is sacredly and exclusively his own, and spread it upon real estate that he holds in inseparable common-right with every gentleman and scoundrel in the state. I say *inseparable*—because the law of enclosing is an absolute mockery; you cannot escape from this infernal hotchpot in this way. Let me show you this melancholy fact by demonstration. Let us assume that A has 100 acres of land enclosed with good and lawful fence: he is peaceful and prudent: he obtains a warrant to have his fence viewed. All is given—and believing himself safe and secure, he goes to work, expends $1,000 upon it in manure, lime, and grass seeds—nature responds and sings for joy: it is the admiration of every one who sees it: the owner in the pride of prosperity, has said in his heart "this is mine"—this is the reward for "mind and industry." Another day, and he is told the mules and hogs of a careless neighbor have broken in upon him and spoiled and destroyed his crop. Indignant, he orders their destruction—but his wife, or a friend whispers "that is not lawful, you can only kill upon the third offence;" he therefore waits for two other October nights of waste and destruction: it is done—mules, hogs, and all lay in promiscuous destruction and death. The owner, careless as he is, watches his right of common, and comes with two or three convenient friends, equally anxious about the right of common. They view the fence and readily conclude that it is not lawful. Suit is ordered for damages, and A is tried by a judge, a jury, and witnesses, all interested and anxious about the right of common, or as it is called in the more artful classes "the right of soil." The fate of poor A, though destructive and discouraging, brought "healing in its wings;" he sold out and went to the "far west." No man can, or will upon any rules of prudence, improve real estate when he is told from the very house-top, that it must be common to all; no sir—all, all is lost to poor Virginia. I have passed through the limestone valley, the mountain and the plain, and all is lost—wealth, industry, and enterprize are all upon the wing. It is a melancholy thing thus to see the pride and bone of a land leaving it, never to return, and yet more melancholy to think that you cannot go with them. I hold it undeniable, sir, that no people can be counted strictly civilized, who hesitate in the protection of property; and he who believes men will be honest unless bound by the law, must be in callow-feather—a mere gosling. It is the province of fools to hope for *hopeless* things, and thus spend their lives. I return you many thanks for your very able labors in the cause of our country, and hope that your reward is ample.

Respectfully,

JEREMIAH.

P. S. Some forty years and more since, Gen. Washington enclosed his entire estate at Mount Vernon. He was not sustained by the spirit of the law, or society, and was obliged to go back to barbarian hotchpot He was denounced for the attempt as a military tyrant!

J.

From the Liverpool Journal.

KYAN'S METHOD TO PREVENT DRY ROT.*

The new steam boat launched on Wednesday, for the city of Dublin Company, is entirely built of wood prepared by Mr. Kyan's process, for which he has taken out a patent. The preparation consists in letting the wood lie for some time in a solution of corrosive sublimate, which impregnates it, and it is said prevents the dry rot. We stated, some months ago, that an extensive course of experiments, at Woolwich, had completely established the fact that Kyan's process does totally prevent dry rot in timber. We have since met with the report from the House of Commons on the subject, and as the matter is of the utmost importance to the shipping interest, as well as to house builders, we have made the following abstract.

The commissioners appointed by the Admiralty to inquire into Mr. Kyan's process, are John Hayes, Dr. Birkbeck, Messrs. T. F. Daniel, A. Copland Hutchinson, and B. Rotch. Jr. They report as to the general efficiency of the process, that timber, canvas, and cordage, thus prepared, had been tested by comparative trials, lasting for years in a variety of ways, at Woolwich, Margate, London, Sheerness, and in no instance had the dry rot attacked them, while unprepared timber, &c., had invariably decayed under the same experiments. That the process renders the ordinary length of time for seasoning timber unnecessary. That the solution diminishes in bulk by absorption, but the remainder is of the same strength as at first. That the additional expense of building the Samuel Enderby, a ship of 420 tons, entirely of the prepared timber, £240; and that the Admiralty are to pay 15s. a load extra for such as may be used in the construction of the Linnet. That the process was not in the least unwholesome, and that the crews of the two ships, wholly built of the prepared timber, were reported "all well" from the South Seas and Indian Ocean. That the bilge water in a ship built of the prepared timber, was pumped out "perfectly sweet."

No doubt can now be reasonably entertained as to the efficacy of the process. That it will be generally adopted we are confident, and the saving will be immense. It is not solely by ship builders that the prepared timber is used. Sir R. Smirke (well known as an eminent architect in London) has introduced it into most of his buildings, and was one of the witnesses in its favor before the committee. Certainly all public buildings should have the advantage of the process. The state of the timber at the Lunatic Asylum in Liverpool is abundant evidence of the injury done to wood by dry rot.

It is supposed that government will purchase the remaining time of the period from Mr. Kyan, and throw it open for gratuitous adoption. Certainly there can be no public objection to this. Dr. Carmichael Smith got £5000 for his disinfecting process; and this discovery for preventing dry rot in timber, is of far greater importance to the public at large.

* A full account of the effects of this valuable discovery was published in a former No. of the Farmers' Register,

REPORT OF THE CHIEF ENGINEER ON THE RICHMOND AND PETERSBURG RAIL ROAD.

To Messrs. Joseph Marks and Son; Lewis Webb & Co.; Lancaster, Denby & Co.; John H. Eustace; Jacob Barns & Co; David I. Burr & Co.; R. B. Haxall; F. & J. S. James & Co. and others, of Richmond; and Charles F. Osborne, Robert Bolling, Samuel Mordecai, and others, of Petersburg; subscribers to the survey for a Rail Road between Richmond and Petersburg.

Gentlemen—I have the honor to present you the following report on the surveys which have been made under my direction, with a view to a rail road between Richmond and Petersburg.

It was ascertained, on a reconnoissance of the country, that a line east of the present turnpike would probably present more numerous curves, and a much larger aggregate amount of deflections, than one west of it. It was thought, however, that it might possess an advantage in admitting hereafter a connection with Bermuda Hundred by a short and economical branch rail road; that the elevation of the dividing ground between the waters of the James and Appomattox would be less on such a line; and passing, as it would for a considerable distance, along the valley of James River, that the expense of roadway formation would be materially diminished. The line traced east of the turnpike has in this respect disappointed the expectations which had previously been entertained. Whilst there appears no great superiority in the character of the portion of it next to Richmond, over the corresponding portion of the line west of the turnpike, the dividing ground is found to maintain its elevation; and as it is to be ascended from more depressed levels, the amounts of excavation and embankment in passing it are, in consequence, very considerably increased.

It was deemed most advisable, under these circumstances, to predicate the estimate to be made on the presumption of the adoption of a line west of the turnpike. The length of a branch rail road to Bermuda Hundred, from such a line, will be increased about two and a half miles; but this disadvantage will probably be deemed of less moment than the adoption of a main line to Petersburg, more expensive in its first cost, and on which, in consequence of more frequent curvatures in its plan, the maximum velocity which may be attainable would be necessarily somewhat impaired. The idea has presented itself, on an examination of the plans and profiles since the completion of the survey, that possibly a line passing west of the turnpike as far as the dividing ground between the two rivers, afterwards crossing the ridge obliquely to a point on the line east of the turnpike, near the crossing of Ashton's Swamp, and thence passing in the neighborhood of the last mentioned line to Petersburg, might, on the whole, present more advantages than any other location. Such a line is at any rate deserving of investigation by the stockholders who may be incorporated to execute the work. It would prove somewhat longer than a line entirely east or west of the turnpike, but would present fewer curvatures than a line altogether east of it, and the length of a branch rail road to Bermuda Hundred would not thereby be increased.

The line selected as above mentioned, as a basis for the estimates which have been made, may be thus described.

Commencing at the intersection of the Manchester and Petersburg turnpikes, at an angle of 4° 45′ with the latter work, it is perfectly straight to the crossing of Proctor's Creek, nearly half the distance to Petersburg. It afterwards, in passing up a branch of this stream, deflects to the left, until it attains the dividing ground between Proctor's Creek and Ashton's Swamp, when it again bends to the right for about 4050 feet; after which it pursues a course varying but little from that of the first portion of the line, across branches of Ashton's Swamp and Tinsbury Creek, about two miles, to station 235. From this point a line nearly straight has been traced to the Appomattox, opposite Mr. McKenzie's.

The grades adopted on the line above described vary between a level and thirty-seven feet. It is believed, on a fine location, that the steepest of these may be reduced, and that no grade need be adopted exceeding thirty-three feet per mile.

In regard to curvature, a consideration of greater moment where high velocities are desirable, the line surveyed is excelled by but few in our country, or the world. There need be on it not more than three or four changes of direction at farthest, and no radius of less than two miles.

The whole length of the line is nineteen miles and forty-two hundred feet. Its extension to convenient points of termination within the towns of Richmond and Petersburg would increase the distance about two miles.

It has been deemed most advisable, for obvious considerations, to defer any surveys with a view to this object, until the organization of the company. It will then become a subject of consideration for the inhabitants of the two towns, and the stockholders of the company, how far the introduction of the improvement within their limits may be important to the attainment of its ends. There can be little doubt that whatever determination may for the present be adopted in regard to it, its connection with the Richmond and Fredericksburg rail road should be ultimately looked to.

The following estimates are believed to present a fair view of the cost of the improvement. The aggregates embraced in the estimates for roadway formation, with the exception of the eleventh and twelfth items, are the result of minute calculations of the cubic contents of excavation, embankment, and masonry on the whole work. It has been deemed unnecessary to give these in more detail.

Grubbing and clearing, averaged at $250 per mile, - - -	$5,000 00
61,647 cubic yards excavation, at ten cents per yard, - - -	6,164 70
201,862 do at 12 cents, -	24,223 44
217,104 do at 13 do -	28,223 52
114,282 do at 15 do -	17,142 30
105,801 do embankment at 11 cts. per yard, - - - -	11,638 11
203,406 do do 14 -	28,476 84
314,899 do do 15 -	47,234 85
7,090 perches of masonry, at $4.50, -	31,905 00
1,400 do do at $2.50, -	3,500 00
	$203,508 76

Amount brought forward	$203,508 76
Cost of extending rail road into Petersburg, including bridge across the Appomattox,	30,000 00
Do. into Richmond, including bridge across the James,	125,000 00
Twenty-two miles superstructure, at $3,500 per mile,	77,000 00
Add for purchase of land for depots and workshops, and the erection of necessary buildings,	37,000 00
For locomotive engines, cars, and carriages,	55,000 00
For superintendence and contingencies, sidelings, condemnation of lands &c.—ten per cent. on cost of road,	43,550 87
Total,	$571,059 63

The above aggregate it is probable may be somewhat reduced on a definitive location. Though not much exceeding what had previously been anticipated by the undersigned, it will probably disappoint the expectations of those of the subscribers whose impressions as to the cost of the work were founded on that of the Richmond and Fredericksburg, and Petersburg rail roads. Involving, as the work in contemplation does, two expensive bridges, it could under no circumstances have been a *cheap* one; and the country between Richmond and Petersburg, it was presumed, would present more difficulties in the way of roadway formation than had existed on the lines of rail road above mentioned. There can scarcely however be a doubt that, even at its increased cost, the stock of the road will prove an excellent investment. Forming, as it will, the closing link in the great line of rail road communication through the state, it will of course command the northern and southern travel, whilst it will, in addition, accommodate a local travel already considerable, and which will be necessarily very greatly increased by the execution of the work in question.

In addition to travel and the mail, a handsome trade may at any rate be anticipated on the rail road. Coal for the supply of Petersburg will be conveyed on it more advantageously and cheaply than in any other manner. Cotton for the consumption of the manufacturing establishments in Richmond, it may be presumed, will be obtained in the same manner; and whilst the effect of the improvement, by adding to the facilities for personal intercourse between the two towns, will probably diminish the inducements for the transportation of produce, there can be no doubt that a fair proportion of whatever *is* conveyed will be secured to the road, even at some enhancement in the price of transportation.

Those of the subscribers who are familiar with the travel and trade between Richmond and Petersburg will be enabled to judge how far the subjoined estimate of the receipts of the rail road will be realized. It is submitted under the belief that it does not at any rate *exceed* what may safely be anticipated within a very short period after the execution of the improvement.

It will be unnecessary to dilate on the benefits, in other respects, which may be expected to result from the execution of the proposed work. Bringing the towns of Richmond and Petersburg within one hour's travel of each other, it will give to the merchants of either town, facilities for the transaction of an extensive business, greatly beyond those now enjoyed by them—to the country tributary to each, the advantage of the capital and enterprise of both—and, to the state at large, the benefits of a commercial metropolis of twenty-five or six thousand inhabitants instead of one of seventeen.

All which is respectfully submitted.

MONCURE ROBINSON, C. E.

Richmond, Dec. 19th, 1835.

Estimate of receipts on the proposed rail road from Richmond to Petersburg.

45,000 passengers at $1 25,	$56,250 00
Transportation of the mail,	6,000 00
8,000 tons of coal, at $1,	8,000 00
7,000 bales of cotton, at 50 cents,	3,500 00
Miscellaneous articles,	5,000 00
	$78,750 00
Deduct for expenses of transportation, officers' salaries, &c.	30,000 00
Net balance,	$48,750 00

The above balance, it will be observed, would pay a dividend of between eight and nine per cent. on the cost of the work. The amount estimated for expense of transportation, it will be seen, is somewhat less than the proportion usually allowed. It is believed however to be ample for the business on which the estimate is predicated. Consisting, as this will principally, in the transportation of persons, the net receipts of the company may be expected, from this circumstance, and the limited extent of superstructure to be renewed, to constitute an unusually large proportion of its gross income.

It is left for those who may take an interest in this improvement, to determine how far its productiveness will probably be increased by the execution of similar improvements south and west of it. Whatever its immediate receipts may be, there can be but little doubt that these will continue to augment with the growth of the towns which it connects, and the increasing intercourse between different portions of our country.

DESTRUCTION OF BUILDINGS BY GUNPOWDER, TO ARREST THE PROGRESS OF FIRES.

[The recent great fire in New York, a calamity unprecedented in extent and importance in this country, was at last arrested only by the use of gunpowder, in the manner described in the extract below, which we take from the New York American. The plan is a novelty to us, and we presume must have been so to most of those then suffering, or endangered by the fire—or they would much earlier have availed themselves of a means so powerful and efficacious, and yet so safe in its application. It would seem, that instead of forbidding the keeping of gunpowder in cities, for fear of fire, a considerable supply should be always at hand as the surest and safest means of arresting the progress of its destructive fury, when other means would be feeble or entirely unavailing.]

Having witnessed and assisted in the whole operation of blowing up the stores that were destroyed—we have the most thorough conviction that no other human means, but that of powder in the manner resorted to, would have checked the progress of the flames.

Broad street, and Pearl street, west of Coenties alley were, beyond all peradventure, saved from conflagration, by the blowing up of the stores in Garden street, that in Pearl street, and those in Stone street. The effect was so manifest, that none who witnessed it can doubt about it. Not less clear is our conviction, that a much earlier resort to powder would have been successful in preserving millions that, for the want of it, were subsequently consumed.

It may not be uninteresting, or without use to state the mode of proceeding adopted in blowing up the stores. Two barrels of powder, generally of 100 pounds each, were taken into the cellar of the devoted building, and placed about the centre of it, at a small distance apart: the heads of the barrels were then knocked out, and a train, by means of planks, or long pieces of calico or linen, of which too many were lying about in the streets, was formed from the barrels to the exterior of the cellar door; on this, straw, of which the crates from the crockery stores supplied enough, was laid, and sprinkled plentifully with powder: the doors were then closed, and all persons desired to retire from the vicinity of the building, except the one who was to fire the train. This was done by laying a burning brand on the straw projecting from the cellar way, and on which, for a foot or two, no powder was sprinkled. After a few moments of intense suspense, a sudden flash, a rumbling explosion, a slight tremor of the earth, the audible shivering of glass windows for a hundred yards around, a dense cloud of sulphureous smoke, and a shapeless heap of ruins, told how well the work had been done. The effect of these explosions was not to project any thing at a distance, for in no one instance probably, was a fragment of any size thrown from the buildings; but rather as it would seem, to lift up and expand the walls—so that beams, floors, merchandize and roof all fell in at once, and upon them and covering them up, the walls themselves. Hence, it was immediately perceived that the danger apprehended by some, of killing and wounding many persons by the materials which such explosions would, it was supposed, scatter far and wide, was not incurred, and that moreover from the compact heap in which the ruins laid, little or no additional aliment was afforded to the flames. Greater confidence was therefore felt in having recourse to such an expedient.

GREAT AND IMPORTANT INVENTION. STEAM SUPERSEDED.

[Who would have imagined that when Homer conceived and uttered the fiction of Eolus' compressing the winds in leathern bags, and giving them to Ulysses to be transported wherever he pleased, thus imprisoned and dormant, to exert all their fury when afterwards let loose, that he was describing nearly the purport of the specifications of the patent right stated below? But however striking and amusing may be the resemblance, we admit that it will not do to laugh at all new discoveries that seem to invite ridicule. For if this test had been permitted to govern the judgement of the world, the invention of steam navigation and steam carriages would have remained, as they were deemed at first, mere subjects for laughter. The splendid results of these once derided schemes, and many others, by which the world has been as much benefitted as disappointed, should make us hesitate in pronouncing the impracticability of any, however ridiculous they may appear at the first view.]

From the Cincinnati Whig.

Our ingenious townsman, Mr. Alex. McGrew, has invented a mode for obtaining and applying power for the purpose of propelling cars upon rail roads, and boats upon canals and rivers, which we deem of the utmost importance, and which, in our opinion, must sooner or later, in a great measure supersede the use of steam. The power is derived from *condensed air*, obtained and applied in a manner so cheap and simple, as to render the expense a matter of little or no consequence. Air used in the manner proposed by Mr. McGrew, has advantages over steam, in many essential particulars. It is infinitely less liable to explosion: but in case of such an event, its power to do mischief is greatly diminished, because of its being unconnected with boiling water. It is likewise much more safe in consequence of its not involving the slighest danger from fire. Where cars or boats are propelled by steam, there is constantly danger from this source, and numerous instances of immense destruction of life and property have therefore occurred from that element. The annoyance, too, arising from the sparks and smoke of steam cars, is very considerable to the traveller, but will be wholly avoided by the use of condensed air. The great and overwhelming superiority, however, of the use of the latter over the former element, consists in its economy. Air may be condensed and used upon the plan under consideration without scarcely any expense, except that which is incurred in the first instance in preparing the receivers and machinery.

We have witnessed, by the politeness of Mr. McG., the practical operation of this invention, and we are fully convinced of its entire success. Mr. McGrew has exhibited his plan and practical models to several of the most distinguished engineers in the United States, all of whom concur in deeming the invention of the highest possible importance, and declare their belief that it will almost entirely supersede the use of steam. The inventor has taken out a patent, and as the schedule furnished at the Patent Office by Mr. McGrew himself, and which is attached to his letters patent, gives a full and clear explanation and description of the invention, we have obtained, and herewith submit a copy of it to our readers.

Copy of the Schedule.

"To all whom it may concern, be it known that I, Alexander McGrew, of Cincinnati, in the county of Hamilton, and state of Ohio, have invented or discovered a more economical mode of obtaining power for propelling cars upon rail roads, boats upon rivers or canals, and effecting other objects where such power may be wanted for the purposes of transportation, than has heretofore been adopted; and I do hereby declare that the following is a full and exact description thereof. My improvement does not consist in the employment of any newly invented machinery, but in the using of such power from falls or currents of water, or other natural or artificial sources of power as has heretofore been allowed to run to waste, and employing the same for the purpose of condensing air into suitable receivers; the elastic force of which condensed air is to be subsequently applied to the purposes herein designated. In numerous situations in the courses of canals and rail roads, and of other roads and water courses, there are falls of water, waste weirs, sluices, dams, etc.; the power from which, if economized, would be ample for the attainment of all the ends proposed by me. I bring this into use by taking the water power from wheels or other machinery already erected, or by erecting others where they do not already exist, using any of the known constructions of such wheels, or other machinery as may be best adapted to the particular situations in which they are to be employed. These I connect in the ordinary way with the piston or pistons of condensing engines, constructed for the condensing of air, and force air thereby into suitable receptacles, or reservoirs, furnished with the requisite tubes, valves, or other appendages, by which they are adapted to the containing of air thus condensed, and to the supplying of the same in measured quantities, so as to operate upon a piston for driving and propelling machinery as high as steam is now made to operate. The means of doing this does not require any description, being perfectly familiar to competent engineers. The air is to be condensed into one large stationary reservoir, and by means of a connecting tube and stop-cock, transferred therefrom into other reservoirs connected with the vehicle to be propelled. What I claim as my improvement in the art of propelling cars, boats, or other vehicles for transportation, is the employment of the waste power of water, wind, or other natural or artificial sources of power, to the condensation of air in the manner and for the purposes herein before set forth."

From Sinclair's Code of Agriculture.

ON BONES AS A MANURE, AND ON THE USE OF SEA-SHELLS, SHELL-MARL AND CORAL, FOR THE SAME BENEFICIAL PURPOSES.

Introduction.

The use of bones as a manure, is perhaps the most important discovery, connected with the cultivation of the soil, that has been made in the course of a great number of years. By means of that discovery, and the improvements therewith connected, an end is put to every difficulty in producing *at home*, subsistence for the people of this country. We may thus be rendered independent of *foreign produce;* and unless our population were greatly to increase, we should be hardly able to consume, without the aid of exportation, the great quantities of corn that can be raised, under this improved system of production. It has become proverbial indeed, "*that one ton of German bone-dust, saves the importation of ten tons of German corn*," and that agriculture is thus rendered in a considerable degree practicable, without cattle breeding, grazing, &c. Were the advantages of the discovery restricted to the use of bones alone,* as they might possibly be exhausted, or raised in price, it would be less important; but fortunately the shells of oysters, and other fish, are found to be equally effectual. Shell-marl also, which abounds in many parts of the kingdom, may be applied to similar purposes; and coral, the banks of which are abundant even on our own coasts, is found to be equally useful. In short, it is impossible to foresee, what may be the ultimate results of this new source of improvement, for by a small quantity of pounded bones or shells, great crops of turnips can be raised; and with the manure which these turnips produce, abundant crops of corn may be obtained, even on the poorest soils, with the aid of judicious rotations.

1. *Origin of the discovery.*—The important discovery, that bones were an excellent manure, was made about the year 1766, by Anthony St. Leger, Esq. a gentleman in Yorkshire, who had employed himself, for a great number of years, in a long course of speculative and practical agriculture, and more especially in making experiments with almost every species of manure.† Dr. Darwin mentions it in his celebrated work on agriculture, "*The Phytologia.*"‡ It is likewise briefly noticed in Sir Humphry Davy's lectures.§ But it was not until the year 1828, that it attracted much public attention, when, by the exertions of an active and public-spirited body, (the Doncaster Agricultural Association,) much useful information, regarding the advantages of this great discovery, was collected and published.‖

2. *Chemical analysis of bones.*—The composition of bones, according to Berzelius, is as follows:

	Dry Human bones.	Dry Ox bones.
Phosphate of lime,	51.04	55.45
Carbonate of lime,	11.30	3.85
Fluate of lime,	2.	2.90
Phosphate of magnesia,	1.16	2.05
Soda, muriate of soda and water,	1.20	2.45
Cartilage,	32.17	33.30
Blood vessels,	1.13	

3. *Manner in which the manure operates.*—It is difficult to comprehend, how so small a quantity of manure, as that employed when bones are made use of, should produce such astonishing effects. But the enigma has been thus explained. Though the plants receive but a small portion of benefit from the bone manure itself, yet by means of that manure, strong young plants are produced,

* The importation of bones ought to be encouraged by a public bounty, and some allowance given to the captains of vessels, who bring bones as ballast in their ships.

† The first account of this manure, was published in Dr. Hunter's Georgical Essays, vol. ii. p. 93.

‡ See Sect. 10. 5. 5.

§ Page 252.

‖ The association appointed a committee, to make inquiries regarding the use and advantages of bones as a manure; and the Report of the Committee of that respectable Association, (which contains much valuable information on the subject,) was published by Ridgway, London, in 1829.

which are thus rendered capable of extracting nourishment, from the substances in which they are placed, and from the surrounding atmosphere. These are acquisitions, the power of obtaining which, sickly or stunted plants do not possess. By the same healthy nourishment, obtained in small quantities during the progress of their growth, the plants are kept in a constant state of improvement. They are thus enabled to absorb the surrounding organic matter, to increase in size, and ultimately to reach their full weight, and utmost perfection.*

4. *On the soils for which bone manure is adapted.*—On light dry soils, bone manure is peculiarly applicable, and it has likewise been found highly advantageous on peat. From 15 to 20 bushels of bone-dust per statute acre, when drilled, have been found to surpass, both on light soils, and on peat, the ordinary dressing of farm-yard dung, and even to exceed pigeons' dung and lime in producing fertility. In wet stiff land on the other hand, the nutritive part of the bones is apt to remain on the surface, and does not so readily mix with the soil as in ground of a freer quality. If previously mixed however, with other manure in compost, it might be advantageously applied, to every species of soil, whether wet or dry, and perhaps, in many cases, might render fallows unnecessary.

5. *On composts with bone.*—It is a circumstance that seems to be well ascertained, and the practice is strongly recommended by the Doncaster Association,† that a compost of bones, with dung, or other substances, is superior to bones used singly. Various substances have been employed for that purpose, as six loads of farm-yard manure, to ten bushels of bone-dust—a quantity of ashes from house fires moistened with urine—five loads of burnt clay, or good earth, mixed with fifty bushels of bones—a compost of soot, rape-dust, red ashes from burnt weeds, &c.

This circumstance merits particular attention, for bones in wet weather do not act, whereas if composts are applied with bones, some of the articles employed will operate; and when the land becomes dry, the bones will probably take effect, and the crop will hardly fail in any season. When employed in compost also, the manure may be more equally spread, and more confidently relied on.

Captain Barclay uses a mixture of bone-dust, and farm-yard manure, in the proportion of ten loads of farm-yard manure, to fifteen bushels of bone-dust *per* Scotch acre. He puts the land in ridges in the usual style, with the dung in the centre, and the bone dust is sown with the turnip seed, by a drill-machine. Under this excellent system, his crops are never injured by the fly. It is important however, that the dung should be two years old, as it will be less likely to be infested with insects.

Others recommend a dressing of eight cubic yards of ashes, and twenty bushels of crushed bones *per* acre, applying them separately. The ashes would first operate, and the bones would complete the production.

6. *On the various modes of preparing bones.*—Mr. St. Leger, who originally pointed out the advantages of bone manure, was accustomed to mix a cart load of ashes, with thirty to forty bushels of bones. After they had been heated for about twenty-four hours, and begun to smoke, the whole heap was turned, and about ten days after it became fit for use. Others have found, that covering bones with quicklime, is an excellent mode of preparing them for use. As soon as the lime becomes effete the bones are picked out, and though retaining their form, they are easily reduced to powder by a hammer, and in that state, they may be thinly spread by hand, or by a machine.*

Dr. Fenwick of Durham, an eminent agriculturist, has suggested to the author, the adoption of the following plan:—where there is no mill to crush bones within a reasonable distance, after chopping the bones, he recommends spreading them between two layers of earth, near a pond, or other supply of water, and to let the heap thus formed, be kept moist, by occasionally sprinkling it, till the manure be wanted. Fresh soils, thus mixed with bones, and watered, will heat as a dunghill and the bones will be rendered so tender by the process, that they are quickly dissolved. As the whole substance is thus sooner applied to the plants, a smaller quantity at a time will suffice, and thus the first outlay will be diminished. The bones wanted for turnip manure, may be thus prepared, even some months before they are wanted.

But the general mode of preparing bones for use, is by crushing them. Bone mills, for that purpose, erected at an expense of from £100 to £200, are very common in the northern parts of England. They are chiefly in the hands of persons who make a trade of it. They are mostly driven by steam engines of from eight to sixteen horse power. Some machines however, are driven by water, and some by horses; but it requires three relays, of two horses each, to reduce eighty bushels of rough bones *per* day: and farm horses have so much to do, in carrying on the operations of the farm, that they have work enough, without being employed in crushing bones. It is better therefore, that this process should be undertaken by a separate profession.

7. *On the proper size of bone manure for quick effect.*—A decided preference is given to bones broken small, and they are frequently reduced to powder of the size of saw dust. Indeed, the more they are divided the more powerful are their effects. But if it is desired to keep the land *in good heart*, the size should be about half an inch.

When the bones are broken to a small size like dust, twenty-five bushels per statute acre are sufficient, but forty bushels are required, if the size of the bones is from half an inch to an inch.

8. *On fermenting bones.*—It can hardly be doubted, that fermentation is necessary to a speedy benefit from bone manure, for when unfermented, though laid on at the rate of even eighty bushels per statute acre, they have at first little effect on the soil. Hence it is that bones, though in consequence of their being boiled or stewed, and passing through an oil or glue manufactory, have

* Quarterly Journal of Agriculture, p. 52.

† Report, p. 20.

* Oyster shells have been advantageously treated in the same way, and have proved fully equal to bone-dust.

necessarily lost some valuable parts of their substance, *yet having been fermented*, they are preferable to those in a raw state,* the fibres of the turnips, or of any other plant, taking hold of them sooner, after the oleaginous part, which impedes their decomposition, has been taken from them. It is in consequence of their being heated, that bones are rather improved in utility, by their being kept in a great body on board a ship, either when imported from other countries, or conveyed at home from one port to another. Bones however, in a raw state, are superior in point of duration, to those which have undergone any manufacturing process.

9. *On the advantages of bone manure, applied to arable land.*—In the cultivation of arable land, bone manure is generally employed for the turnip crop.

This is productive of numerous advantages; the use of this manure, diminishes labor at the season of the year, when time is of the greatest importance, for one wagon load, containing a hundred and twenty bushels of small bones, fit for the drill, equals from forty to fifty cart loads of fold manure.

Its suitableness for the drill, when converted into dust, and its great fertilizing properties, render it peculiarly valuable in those parts, where from the distance of towns, or large villages, it is impossible to procure manures of a heavier and more bulky description. It is evident, that there can be no seeds of weeds, or larvæ of insects in bone manure, which is generally the case in farm-yard dung.

It is an immense advantage, (if bones are properly used,) that a severe drought will not prevent a crop of turnips, even in seasons, when all other manures will fail. A number of valuable animals are thus preserved from perishing, and manure obtained for the succeeding crops in the rotation.

When bones are used, the farmer is but little troubled with the fly or beetle, so injurious to turnips, for as soon as the plant reaches the bones, they immediately get into the rough leaf, and no fly touches them; whereas with dung, particularly if it is only one year old, the fly is generated, and in dry weather, the continued sunshine matures them, and from want of rain or cool weather to thin them, they come into action in great numbers, and destroy the young plant.† It has also been remarked, that the disorder, called fingers and toes, has been less prevalent since bone-dust has been in use.

Turnips raised by bone-dust, are said to be superior in quality to those produced by any other sort of manure. They also remain quite green, when the same crop, laid down with other dressings, is entirely destroyed. The roots also, are quite of a different quality, being much firmer, and more nutritious, while the succeeding barley ripens earlier, and is increased in quantity. The succeeding crop of clover also, is said to be improved in the same proportion.

In thin sandy soils, with a gravelly subsoil, if rape dust be used, it is often washed away by rain, and in very hot and dry seasons, the strength and virtues of dung are apt to be evaporated. But in all seasons, and under all circumstances, bone manure is found to be productive.

Bone-dust as a manure may, with comparative ease, be applied to lands at a great distance from the homestead, or of difficult access; also in situations where the surface is broken by rocks, or so steep, as to make it difficult to cover dung, (where it is used) in the drills.

Turnips however, produced by bone manure, should be consumed on the ground by sheep, to prepare it for the succeeding crop of corn, as the effect of such a small quantity, cannot be supposed to continue through successive crops; but if any part of the turnips be removed, care should be taken, to clean them well when taken up, otherwise the small particles of bones, which are found invariably adhering to the roots, would be carried off the land.*

It is an immense addition to all these advantages, that when this extraneous manure can be made use of, the dung produced on the farm, not being required for the turnips, can be advantageously applied to the other crops in cultivation.

The following is a comparative statement of the expense of manuring an acre of land with bone-dust, and with dung, allowing forty-five imperial bushels of the former, and thirty tons of the latter, and supposing the distance of the farm, from the place where the manure is supplied, to be five miles.

To 30 tons dung, at the low price of 5s. per ton,	£7 10 0	
Cartage, tolls, &c. for 30 carts, at 2s. 6d. per cart,	3 15 0	
		£11 5 0
To 45 imperial bushels of bone-dust and drill, average price 2s. 8d. per bushel,	£6 0 0	
Cartage, &c., one cart,	0 2 6	
		6 2 6
Additional expense of an acre manured with dung, compared with one manured with bones,		£5 2 6

The above great inferiority of cost, when taken into consideration with the very great difference of labor, and the greater richness and durability of bones as manure, over dung, form a very striking contrast indeed.

10. *On the advantages of Bone Manure applied to grass lands.*—On grass, bones should be sown in the state of powder, in autumn, by the hand, or if the quantity allowed is small, early in the spring;† but previous to its application as a top-dressing, the five coulter cutting plough, or scarificator, should be employed to open the ground. The manure has thus a more speedy influence upon the grasses. There is less waste of it, and its effects are more beneficial and complete, than when it is merely thrown upon the surface, and left to work its own way, without any such assistance. When thus managed, bones have a greater effect on grass lands, than even on arable.‡ The cows

* Doncaster Report, p. 9; also p. 22.

† Doncaster Report, pp. 9 and 10.

* Hints from Mr. Grey of Millfield.

† If bruised bones were used they might interrupt the progress of the scythe.

‡ Doncaster Report, p. 14.

pastured on lands thus manured, are so much improved in condition, that they will produce about twice the quantity of butter, than when feeding upon land of similar quality, but not boned; and the pasture, in regard both to quantity and quality, is greatly ameliorated for a number of years. When the field is in hay, the crop is likewise more abundant—the aftergrass more nutritious—and the herbage it produces is so peculiarly sweet, that cattle and sheep will hang upon it, as long as they can find a blade of grass to devour.*

But we are told, that bone manure is an article that may be exhausted, and that a supply cannot be confidently relied on. That idea however, cannot be admitted. Bones might be brought, even in considerable quantities, *in ballast*, from the most distant countries; and from the Brazils, where cattle are so cheap, as to be killed for the sake of their hides alone, the supply would probably be abundant. Besides, there are many other substances, as horns, the shells of sea-fish, coral, and shell marl, which may answer the same purpose, and the produce of which is perfectly inexhaustible. Horns are found to be a more powerful manure than even bones, for they contain a larger quantity of decomposible animal matter, but being much used in various manufactures, their shavings or turnings alone, are applicable to agricultural purposes; and though they form an excellent manure, yet they are not sufficiently abundant to be much used. They are sown by the hand, as a top-dressing for wheat, and other crops.†

Shells of Sea-Fish.—As bones are likely to become rather a scarce article, it may be difficult to supply them in quantities adequate to the demand: it is a most fortunate circumstance therefore, that the shells of oysters and other sea-fish, when properly reduced in size, have been found equally useful as a manure. Their utility would be much increased, if they were sprinkled with sulphuric acid, by the addition of which they would be converted into gypsum.

Shell-Marl.—Among the articles that may be used in aid of bone-dust, there is none better calculated to raise abundant crops of turnips, than shell-marl. It consists of calcareous matter, the broken and partially decayed shells of fresh water fish, found often in morasses, and at the bottom of lakes and ponds. It possesses great stimulating properties, and is highly beneficial in fertilizing the soil. There can be no doubt therefore, that it furnishes the means of producing various crops, and turnips in particular, if employed in the same way as bone-dust, namely, inserting it into the drills, with the turnip seed. There is every reason indeed to hope, that its growth would thus be rendered so rapid, as to prevent the attacks of the fly. The field should be put in drills in the usual style; a moderate quantity of fish manure, or fermented dung, say at the rate of two tons per acre, put in the centre of the drills, and the turnip seed and shell-marl mixed together, sown by a drill machine above the fish or dung.

By this simple process, immense crops of the Swedish, as well as the common turnip, might be obtained; and perhaps that still more valuable plant, the mangold wurtzel, might likewise be successfully cultivated.

*Worgan's Survey of Cornwall, p. 130.

†Davy's Lectures on Agricultural Chemistry, p 253.

The addition which this plan would make, to the value of the counties of Caithness, of Forfar and other districts in Scotland, where shell-marl abounds, is hardly to be credited.

Corals.—If every other substance of a similar quality were to fail, it is a fortunate circumstance, that corals might be obtained in inexhaustible quantities. Banks of them have been found in some of the Western Islands of Scotland, and in the parishes of Southend in Argyleshire, and of Loch Broom in Ross-shire. It is well known that corals are of animal origin, and wherever they have been tried, their effects have been highly gratifying.

Conclusion.

By these important discoveries in the art of agriculture, an end is put, to all the fanciful divisions of our soils, by political economists, into a certain number of zones, according to their supposed fertility. All these zones, by means of these discoveries, may be rendered equally productive. Already, it has been completely ascertained, that, by means of bone-dust, the poorest, coldest, and most humid lands, in various parts of England, have been brought into the highest state of cultivation, and improved in regard to their produce and intenseness of fertility. It can no longer be doubted, that, by means of bones, and the other substances above enumerated, the coldest clay, and poorest heaths, may be rendered productive.

A foreign agriculturist, astonished at the immense exportation of bones from the Continent of England, instituted some comparative experiments, the results of which prove, that bone-dust acts in the cultivation of grain, when compared to the best stable manure,—

1. In respect to the quality of the corn, as	7 to 5
2. In respect to quantity, as	5 to 4
3. In respect to durability of the energy of soils, as	3 to 2

It is a strong argument also, in favor of bone manure, that it is found to benefit, not only the particular crop to which it is applied, but that it extends its influence to the succeeding ones, and that, even in the following courses, its effects are visible, in the improved quality of the soil, and the efficiency of a smaller quantity of bones, than was at first necessary to insure a crop.

It may be proper to conclude this interesting inquiry, with some general remarks on the utility of manures.

It has been justly observed, that all vegetables, naturally incline to that state in which they existed, when sown and produced by the hand of nature, without any artificial aid; and that the great objects of agriculture are, 1. To keep up vegetables in that *unnaturally luxuriant state*, in which they are brought by cultivation; and, 2. To preserve their health, and distinct character and properties, while they are in that state. For these important purposes, the application of manures is necessary. It is not essential however, that the manure applied should, in all cases be sufficient to maintain that unnatural luxuriance of the plant, which it has acquired in the course of its cultivation, for many plants, in particular turnips and potatoes, draw nourishment from the atmosphere as well as the soil, and consequently do not require the same quantity of manure, as in the case of corn, where the growth of the plant, in a great measure, depends upon the fertility and richness of the soil.*

[The foregoing article is from the Addenda to the last edition of Sinclair's *Code of Agriculture*, and may be supposed to present whatever was known of the valuable properties of bone manure. But there is one objectionable part, which by attempting to prove too much, might, with some well informed readers, weaken the sound testimony of the balance. We refer to the recommendation of pounded oyster shells as a substitute for bones, of equal value. Pounded oyster shells are almost a pure calcareous manure, consisting of carbonate of lime entirely, except a very small portion of gelatinous animal matter. None of our readers will charge us with *underrating* the value of such a manure: but highly as we would estimate it, its chemical composition is altogether different from that of bones—and its action as manure may be supposed to be also quite different—as it certainly is greatly inferior to that of bones, which consist of *phosphate of lime*, combined with a very large proportion of gelatinous or other alimentary animal matter. Sir John Sinclair's agricultural works stand deservedly high: but, as we have elsewhere remarked, so voluminous a writer has been necessarily furnished by others with much the greater part of the matter of his writings—and as a consequence (in some degree perhaps unavoidable) some passages and statements of facts are admitted, which a stricter scrutiny would either have rejected, or so explained as to present quite a different aspect. The author of so many works was necessarily, like the editor of an agricultural journal, principally a compiler and publisher of other men's opinions—but the difference is, that while an editor is responsible for no opinion which he merely publishes, or selects from other journals, the compiling author makes the materials of others his own property—and if his name is high authority, he thus, through want of examination, gives currency and importance to mistakes or false statements.

The idea that "the utility [of sea shells] would be much increased by *sprinkling them with sulphuric acid*, by the addition of which they would be converted to gypsum," is as ridiculous as any practicable scheme of the philosophers of Laputa. In addition to the enormous and unnecessary expense of thus manufacturing gypsum, the result would be to give to the soil a manure entirely different in chemical composition—and which, however valuable in suitable applications, might be useless and wasted, where the shells would be most necessary and profitable.]

* See some ingenious observations, entitled, Remarks on Manures, and on the Action of Ground Bones on Plants, and the Soil. Quarterly Journal of Agriculture, No. 1. p. 13. Mr. Mason of Chilton tried the following experiment: "He applied forty bushels "of bones, broken small, with eighty bushels of burnt "soil, to one acre, and to an acre immediately adjoin-"ing, forty gallons of unrefined whale oil, (which cost "8½d. per gallon,) mixed with one hundred and twen-"ty bushels of screened oil." This last mixture was made one month before it was used. The result was, that the soil and oil gave him at the rate of 23 tons, 5 cwt. 6 st. per acre, while the bones and burnt soil produced 21 tons, 18 cwt. 6 st. per acre, making therefore, a decisive difference, in favor of the fine earth and oil. See the Doncaster Report, p. 30.

The attention of the spirited farmer, to its important experiment, cannot be too strongly recommended, for oil would be a much more accessible species of manure than even bone-dust, and could be had in greater quantities, and at a cheaper rate.

The want of an experimental farm, to try the effect of such experiments as these, is deeply to be lamented. In the interim, it is highly desirable, that *agricultural associations* should endeavor to supply the deficiency, by a diligent inquiry into the practices of different farmers, and a publication of the most important improvements, which they have respectively discovered. This is an advantage, which has not hitherto been obtained to the extent it ought, owing to the attention of the public, not being hitherto sufficiently called to the immediate and extensive advantages which would result from habits of inquiry. Hence, owing to the want of communication and intercourse on practical farming subjects, the improvements adopted by one farmer, are unknown, even among his nearest neighbors. It is next to impossible, that hundreds and even thousands of intelligent men, should be in the practice of directing and superintending agricultural operation, without making some improvements in their method; and it cannot be doubted, that the advantages accruing from the improvements they have discovered, might be made equally available to all other farmers. But unfortunately, from the seclusion connected with a life, entirely devoted to the pursuits of agriculture, individuals are not led, by the great impetus of self-interest, to make their improvements public; on the contrary, they are frequently inclined to conceal them. This great deficiency can best be supplied, by means of agricultural associations making a diligent collection of facts, and communicating them for the public benefit. See the valuable Report of the Doncaster Association, p. 32.

EXTRACTS FROM THE MANUSCRIPT NOTES OF A FARMER.

[Continued from page 539.]

Letter III.

To the Editor of the Farmers' Register.

Holmesburg, Nov. 22, 1835.

I thought you would lecture me about slavery. If I should say any thing which you think might give offence, pray alter it or strike it out—but I have no such wrong and foolish intention. I am no abolitionist. I do not view slavery as a crime, but an error—alike injurious to all future and permanent interests. Doubtless it has great and beneficial effects, otherwise it never would have been permitted to exist. But it is clearly not a permanent institution. If it is viewed as a crime, every one who pays wages below the bread and meat power of subsistence, in the North, in England, Ireland, &c. are much more criminal than the slaveholders in warm climates: because animal food and warm clothing are much more essential to the existence, well-being and comfort of man in the former countries than in the latter. We have sins and errors enough of our own to correct and reform, without crusading amongst our neighbors. If principles and the operations and effects of the observance and non-observance of the laws of nature, are clearly proved and shown and properly stated; all may be convinced upon all questions in due time, (every one should study geology, and the progress of man as well, to learn how the laws of nature proceed,) without offending and doing injury and injustice to any. I look upon the immediate abolition of slavery in the West Indies as one of the greatest national errors ever committed—but such an event must be for some great purpose. The English are perfectly insane upon this question. Entirely ignorant of direct, immediate, *personal* slavery, they view it as an abstract principle—and totally disregarding all *known* and *unknown* principles of human nature, and of the laws of nature, they abolish their slavery there with the stroke of the pen! It is the second step to the dismemberment of the British empire, which is likewise clearly not a permanent one. Free government, or rather the first principles of it, were first developed in temperate climates, in an island in the middle latitudes of Europe. The germ of free government in the tropics was first established in an island likewise, (Hayti.) Why freedom has first been so established may, I think, be easily shown. As it proceeds, you will have a difficult task to perform in the south.

You are at liberty to publish all you think fit, unless I request otherwise at the time. You say you do not yet understand my views, or to what school I belong upon political economy. I will state my views upon manufactures, food and population, in connection with agriculture, as I proceed in my communications. I scarcely belong to any school upon any subject. Condy Raguetism, Matthew Careyism and Tappanism, &c. are all wild, impracticable and mischievous errors and extremes of the same class—that is, in the present state of society. If the means and ability to manufacture exist, Matthew Careyism is infinitely better than Condy Raguetism—the latter being altogether an abstract principle, only to be established when man is perfect, and in this I firmly believe—it is easy to prove. The Creator is perfect. Protection I hold to be necessary to enable manufactures to be established—being long established elsewhere—and duties I consider as wise and politic in the present state of the world. Most of our duties are now paid by the foreign producers—formerly, not at all, or very little. I think the United States paid the taxes of others long enough. Coal, for instance, was formerly ten and twelve dollars and more, per ton—now five and six, with a duty of two dollars. Who pays that duty? Certainly not the consumer. So with many other productions—the foreign producer now lowers his prices. If an article is not produced here, and the duty is moderate, it is paid by the consumer—if very high, it is paid by the consumer and foreign producer, as is exactly the case with your tobacco. If that duty was moderate, you would probably obtain 25 to 50 cents per lb. instead of only a few cents. That duty is paid by the producer here, and the consumer in England. If an article is partly produced at home, and partly imported, the foreign producer pays most of the duty—that is, he sells for less than he otherwise would do. If the duty upon tobacco in England was ten cents instead of seventy, (it was eighty cents!) the producer here would receive more, and the consumer there would pay less than they now do. If there was a duty of 20 cents upon cotton in England, the planter would only get about five cents, as he does for tobacco.

I never could understand why the South so furiously and vehemently supported the monopoly of England! It should have said to the North, "if you are ready and able to begin manufacturing, we will help and support you to break that monopoly, and God speed you—for monopolists always sell dear and buy cheap." With two or more markets, we shall get more for our raw materials, and pay less for the goods, which is now the case, as I always predicted. England had the monopoly of the world, and well she has made it pay! The United States has now a surplus revenue of near twenty millions, and no body knows where it came from! and there might have been near twice as much obtained as easily.

Before the Erie Canal was made, most of the northern store cattle came here. We paid from fifteen to thirty dollars ahead. After it was finished, they were chiefly fed and killed at home, and they rose to twenty-five and forty dollars, and beef fell two and three dollars per cwt.—the latter now rising again from the great increasing demand. Facts are stubborn things.

When Congress took off the duty upon coffee, Ferdinand VII. laid it on as an export duty at the Havana, with an import duty of six or eight dollars on flour! Condy Raguetism will not do yet—and Jonathan is not always as sharp-sighted as he might be.

You seem to wish me to write more about *direct practical* agriculture. I thought it better to say something first as to what the true principles of agriculture are, and what is required for their establishment and existence—besides I wish to see a little more of the results of my present crops, for it is only lately I began my present practice. The promise is such as I never saw before. I am confident I am right—but we must never halloo too soon—a small error or failure under new circumstances, no matter from what cause, is enough.

In 1833 I top-dressed a grass field in the fall. Its condition was good. 1834—mowed it, ploughed immediately—six weeks after sowed ruta baga without manure. Such a crop I never had, or ever saw, and I have seen thousands of acres. The extremity of the leaves measured 11 feet in circumference: they looked like the rank vegetation upon the banks of rivers. How often I looked at them! the feelings I would not exchange for any man's. 1835—Barley and down again with grass for three years. The barley was superb—not yet thrashed. One of my pupils who returned from England this summer, said he saw none so good there: an Englishman said the same. I intended top-dressing it again this fall, but the grass is so luxuriant I thought it better not to do so. I have just lightly limed and plastered it. Oh! but it is a glorious system—and it costs nothing.

GEORGE HENRY WALKER.

Holmesburg, January 12th, 1836.

Letter IV.

You still appear (by your letter of Dec. 11th,) to be the most desirous about *practical* operations. Now, farmers are not in much repute amongst other "learned" and "polite" professions, and consequently, not so with each other: when this is the case, is not a little mystery and delay the best?—better not to tell all at once—excite the curiosity—endeavor to state the *true* principles of agriculture *first*—then people will say, "I did not think of this before—this is a sensible fellow—I should like to know what his practice is, and *more* of the results." We are thought too meanly of, and we think too meanly of ourselves; that is, of our profession—its value and importance. The remarks of Col. Bondurant upon this subject, in your December No. are excellent. I want to say something about this in my notes upon Brooks' letter from London, and about the true principles of agriculture—and we can poke in a little *practice* as we go along. Practice, by itself, is like recipes, prescriptions, good advice, &c. in the newspapers—soon forgotten, and little attended to.

Don't be afraid of some of my heterodox opinions: they will come in, and tell by and by; for I have a strong hold against, at present, high established authorities. *Between ourselves*, I have made the greatest and most important discovery ever made by man; this is in agriculture, and in political economy, as regards food and population. It is of no use to myself and society to tell this *publicly*, all at once. I am perfectly confident in the truth of my positions. I call my practice the anti-Malthusian system of agriculture.* A word about it. Do you not see that man has never yet lived according to the *natural* law of his subsistence—which is, according to his organization; that Malthus and his followers never thought of ascertaining what this law is, and the corresponding law of agriculture!!!—and hence all their errors. Do you not see that man has hitherto deemed it of no importance whether nations subsist upon bread, potatoes, rice, or Indian corn, &c., with little or no animal food; and hence the utter exhaustion of the soil; because vegetable matter, (grass, roots, &c.) and animal manure (with calcareous matter as the governing power, in duly proportioning stalk, leaf, fruit, grain and seed—) have, under these circumstances, been almost wholly wanting; and hence the "decline and fall" of Rome, (and all other empires,) with accomplishing which, Cæsar had no more to do than Gen. Jackson had. Individuals have no such power as *that*, either for good or evil—particularly the latter. The fall and permanence of nations depend upon the non-observance and observance of the laws of nature, by the *mass* of the people—not upon the acts of individuals.

I consider that man was formed to subsist upon animal and vegetable food, in certain proportions; the proportion of animal food increasing with decrease of temperature—obviously for the wisest and best purposes; and that the true principles of agriculture are conformable to this law of subsis-

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* The theory of Malthus of the laws of population and subsistence, may not be familiar to all who will read the remarks of our correspondent—and therefore we may be pardoned for presenting the following concise statement in explanation.

The doctrine of Malthus, (which has obtained the assent of almost all political economists,) is, that population naturally increases in a geometrical ratio, while food can only be incr ased in an arithmetical ratio Suppose that marriages on an average produce 4 children, who may themselves live to marry: then each generation will serve to double the population, according to the ratio of 1, 2, 4, 8, 16, 32, &c. Let the rate of increase be ever so much slower, it is still in a geometrical ratio, and, in a longer time, will produce similar results.

In a country thus increasing in population, the quantity of food, or means of subsistence, will of course be increased also—but however rapidly, it will not be in geometrical, but in arithmetical proportion—not by doubling—but by regular additions of equal (or more often of decreasing) quantities. Thus food may increase at first, (and generally will, in new and fertile countries,) even faster than population—as in the ratio of 1 to 4, (or by additions of 3)—but then it will be only at the rate of 1, 4, 7, 10, 13, 16—and of course the increase of population will be rapidly overtaking, and then outstripping the means for its support.

The rule, however, can only work freely and fully so long as there are no checks obstructing propagation —and there is no country, no condit'on of man, in which such checks do not operate with more or less force. *Perhaps they have less influence on the slave population of most of the southern states, than on any other class in the world.* The checks are either *prudential*, *moral*, or *physical*—the latter being the state of starvation and other extreme suffering following want of food. The first two checks to population serve to restrain the natural tendency to propagation—and if *they* are not exerted, the *last one* serves effectually to destroy the redundant increase and to reduce population within the limits fixed by the amount of subsistence then furnished by the industry and products of the country.

The inferences are—that the most prosperous and fertile country, with the best regulated society, contains the seeds which will surely produce an abundant harvest of misery. There is no effectual remedy—and the only hope for mitigating the weight of these approaching inflictions, is the rigid enforcement of the operation of the three checks to population. This stern, repulsive, and stubborn doctrine, wars with the strongest as well as the most generous natural impulses of the human race, and even forbids the exercise of acts of charity, by continually warning us that in giving present aid and comfort, we are producing a ten-fold amount of future misery. We have not read Malthus for nearly twenty years—and now state his views, and our own inferences from recollection--but the lapse of time has not lessened our submission to his reasoning. Though we doubt the ability of our correspondent, and of all other persons, to show the theory of population to be false, we heartily wish him success, and should be rejoiced to yield to his arguments our present unwilling conviction of the truth of the heart-benumbing, hope-stifling doctrine of Malthus. Ed. Farm. Reg.

tence, and that this law of subsistence is conformable to the true principles of agriculture. England, and the United States still more, have observed those laws the best, and hence their prosperity and advancement above all other nations. How strange the political economists have never studied this part of the question! They have never yet even thought of it!!

I have endeavored to form my system of farming upon those principles. I told you of my superb crop of turnips without manure—after grass, top-dressed the year before. The barley after them last year (without manure,) will be 50 bushels per acre, if not more, (not quite all thrashed yet,) and a fine sample. I intended to top-dress the grass in the barley stubble, last fall, but it appeared too rich, and I put the manure upon a poorer stubble. A few years ago this land would not grow more than five bushels of barley per acre, of the worst quality. The field was three years in grass previous to the turnips (ruta baga). With this system, deficiency of food and excess of population is an idle fear. The first year I mowed six wagon loads of hay per acre; the second, four loads; the third, top-dressed, three loads. It ought to have been top-dressed the first year. Manuring old grass is of little service to the coming crop; it is like trying to renovate the youth of an old man. But it is of great benefit to the succeeding arable crop.

As grass and arable cattle crops are duly proportioned to, and alternated with grain and other crops for man, according to the natural law of his subsistence, so will the fertility of the soil be the greatest, and the labor the least, leaving the *mass* of the population for manufactures and commerce, and all other professions. The practice of mankind has hitherto been perpetual tillage, with separate or little or no grass; or grass very partially attended with arable crops; or arable cattle crops and some grass, occasionally alternated with arable crops for man; with separate permanent pasture and meadow, as in England. Hence utter exhaustion of the soil—partial improvement, and stationary medium fertility; and hence under these circumstances, more or less deficiency of food, and excess of population; and hence again, under these circumstances, the full truth of the Malthusian theory. But Malthus evidently knew not why or wherefore, nor how to remedy the evils and errors, but by *breaking a third law of nature!*—for of the *natural* law of subsistence and of the corresponding true principles of agriculture, he knew nothing—nor even thought of them. Had he investigated them, and studied how far they had been observed, and how much they have been broken, neglected, and unduly observed, he might have been led to infer far greater perfection, wisdom, goodness, beauty and harmony in the laws of the supreme and all-wise Creator, than his sad and disheartening theory implies. There are the means of subsistence for *all*, if the laws of nature are duly observed by *all*. I should be sorry to believe it otherwise. To regulate the numbers of mankind is no part of the prerogatives of man. This can only be in the hands of that power which created him. But Malthus has opened the door to the truth, and that is a great deal. His theory, with other circumstances, and a knowledge of the condition of the people of England and the United States, led me to the discovery of what I am quite confident is the real truth in this greatest and most important of all questions, affecting the condition, well-being, happiness, and civilization of man.

GEORGE HENRY WALKER.

From the Southern Agriculturist.

ON MANURES.

Report of the Committee on agricultural subjects, to the Society for the advancement of learning in South Carolina.

Gentlemen—Having been honored by your choice to present to you some agricultural subjects which may be interesting and advantageous to our state, we must, notwithstanding the inadequacy of our knowledge and experience, to do justice to so copious a theme, exert our feeble powers. Relying on your indulgence, we hope to take such views of the subject as may enable you to glean a few ears from among the stubble.

Although agriculture is the most ancient, and the most honorable, because the most useful and necessary profession, it is, as a science, as yet, in a surprising state of imperfection. It has always added to the glory of the states which have given it encouragement, and when skilfully conducted, has ever proven a source of individual wealth and national power. We cannot, therefore, bestow upon it too much of our care, nor seek with too much zeal the surest modes of securing the incalculable benefits to be obtained from it. Indisputable as these propositions are, it is a strange anomaly in human affairs, that this, most necessary wealth, and power-giving art has never had a regular footing in the schools of the ancient or modern world, there to be taught with the other arts and sciences which have given to man so much cause to be proud of the efforts of his reason and of the flights of his genius. Is it because, it is the most easy and least intricate vocation? The most superficial observers only can look upon it in that light. It is very true that the industrious man, though guided by ignorance, is generally enabled to make a support, and even, in some cases, to acquire affluence; but we must also admit that his exertions are most bewildered, and his success most limited, when a difficulty arises that baffles the routine of his operations.

The knowledge required to form a competent agriculturist, is as profound as it is various. So great is the amount and multiplicity of that knowledge, that we may well doubt the practicability of its ever being all possessed by one individual, be his talents, industry and opportunities ever so great. Every branch of science or of art is directly or indirectly connected with rural affairs. We shall not make the vain effort to enumerate them, we shall only point out a few of the nearest, such as mathematics, natural philosophy, botany and the physiology of plants, and the philosophy of vegetation. Chemistry is also indispensable; for it is in various ways intimately connected with agriculture.

The first principles, however, to which we must confine our labors for the present, include the knowledge of the different kinds of soils, and the adaptation of each to every particular object of culture.

Fertility depends on various circumstances; for, not only the upper stratum of the soil must be compounded of the proper earths and other substances necessary to constitute a good soil, but the subsoil also must have properties to correspond with the upper. A few inches of the very best soil would be of little avail over a stratum of impermeable clay, or over a thick bed of pure sand or gravel. The former could not afford room for the extension of the roots of plants, and it would retain too much water which would stagnate and destroy vegetation, while the latter would suffer all the water to sink and leave the surface too dry for the desired purposes. It is frequently impossible to remedy the defects of the subsoil; but, when it is feasible, the upper stratum may be improved by adding to it such substances of which it may be deficient, even to the degree of bringing a very steril soil to a high state of durable fertility. Indeed, we can see no reason why such soils should not, by proper means within our power, be brought to the very highest state of fertility to which land has ever reached in any part of the world. Land, at the north, has been made to yield upwards of 170 bushels of corn to the acre, which land was probably not originally of the highest grade. We have the same means of improving our land as the people of the north, and we have a more sure climate in our favor. Can any one show that it is impossible to make much of our land equal to the best of Alabama? We think it not only possible, but practicable. In order to do this, however, we should know the constituent parts of those richest soils, so as to know how to form one, the most requisite for fertility.

Many of the arts, assisted by science, have been in our day, carried to such perfection, that he who should, only a few years back, have ventured to predict that which we now witness, would have been thought a fit subject for a lunatic asylum. Agriculture is, at the present time, in the state that some of the improved arts alluded to, were a century ago, and no man would now dare to predict what wonders may be achieved in this department, if proper means be adopted and prosecuted with zeal. We venture to assert, that there is not one object of the pursuits of man, more deserving the use of these proper means, and of the most zealous perseverance than agriculture. This is true, with very few exceptions, in every part of the world; how much more then is it of a country like this which is essentially and exclusively dependent on the produce of the soil. This is emphatically true of the south-eastern states. Depend upon it, not only your prosperity, but your independence, nay, probably, your very existence rest on the exertions now recommended. We shall not say, gentlemen, for your own sake, but for the sake of your wives, children and their posterity, and for your own posthumous fame—reflect on this, and act promptly.

Arable soils are composed of silicious, aluminous and calcareous earth, to which may be added the magnesian. This last is most frequently absent, and its use, as a component part, is not yet well ascertained. It is supposed not necessary to the formation of a fertile soil. The other earths in due proportions, with a suitable quantity of vegetable and animal matters, or putrescent manures, form the richest soils known to agriculture. Either of them, by itself, is perfectly inert and steril. The first, viz. *sand*, is usually, if not always the most abundant in all cultivated soils, even in those denominated aluminous or clay soils. The third, viz. *calcareous earth*, which is most generally in the form of carbonate of lime, is the least in the component parts of fertile soils. Silicious and aluminous earths are never absent in cultivated land; but calcareous earth is frequently so, at least in a perceptible degree. Without it, however, no soil is naturally or can be made by art permanently fertile; for although putrescent manures exert their fertilizing powers, when no calcareous earth is present, their beneficial effects are comparatively evanescent. We have said that neither of these constituent earths, by itself, is otherwise than perfectly steril. We have sufficient proofs of it in the chalks of Europe, and the bald prairies of our western country, as regards the calcareous earth; and we need not point to examples of pure sand, or pure clay to prove our assertion.

From what proceeds, it is evident, that when it is desired to ascertain the qualities of a soil, it is best done by analysis, by which alone the proportion of each of its component parts can be ascertained. If it be found that one of the necessary earths is wanting, or is insufficient in quantity, such a soil can only be rendered fertile by supplying the deficiency. We have said that of the three principal earths, the calcareous is the most frequently deficient, and this is unfortunately the case in a great portion of this state. But although it is most often found wanting in the upper soils, we are not left quite destitute of resources; for, in a considerable section of the country, all below the falls of the rivers, rich and extensive beds of carbonate of lime, in the shape of fossil shells, are to be found a few feet below the surface, and these can supply the deficiency. By means of these very extensive strata of shells, immense tracts of land in the low country, which are now abandoned as exhausted, can be, not only restored to their primitive state, but also be brought to a state of fertility far above that which they ever possessed. It cannot be denied that to perform this requires much labor—and your committee do not pretend to free you from the original sentence passed upon us: "In the sweat of thy face shalt thou eat bread." The question then is, is it worth while to undertake such a great work at the cost of so much labor?—or is it not better to abandon our impoverished state and seek fertility in the western wilds? Too many, far too many have already taken the latter alternative, and the population and wealth of our dear state are fast removing to the west. If this system of emigration is persevered in, we ask, in dread of the answer—we ask, with the feelings of men exposed to the most imminent danger, what is to become of the state—the glorious, the hospitable, the chivalric state of South Carolina? We wait not for an answer—but we bid, or rather pray you to turn your eyes towards Italy, to the *Campania di Romana;* to the former mistress of the world herself, and there the answer is most solemnly written in most distinct characters. That country, once the garden and pride of the world—the dwelling place of its masters—where is all its glory? Gone, gone forever. The palaces and gardens of the Cæsars, and of all the great names which are yet the pride of history, are all replaced by infectious marshes, where nothing but desolation, misery and death can abide. Say not, gentlemen, that we exaggerate the prospect before us; that, at all events, such a condition is far from us. We hope it is very distant, and pray that the similitude may never be realized. But where are now the elegant abodes of hospitality, those palaces that, not many years since adorned the avenues to the good city of Charleston for many miles? There is scarcely any thing left of them except the magnificent lines of live oaks that led to them. These now act as the *ignis fatuus*, and entice the stranger in the hopes of finding the hospitality which seem promised at their termination, when he finds a void, if not a dangerous morass. The great cause of the calamitous change that has thus taken place in Italy, is the neglect of agriculture, by which the fair fields of productiveness became noxious and dismal morasses, yielding the deadly malaria, instead of the rich harvests of corn and luxurious gardens. You will say: 'but the Goths and Vandals came and ravaged that country, and began, what sloth and luxury finished.' True, they did come; but are we not also threatened with the Goths and Vandals? Shall we, like the Romans, suffer sloth and luxury to cause our ruin?

The efforts of the southern states should be directed to the encouragement of a middle class of population, and let every avenue be opened for this class to take rank with the first. For this purpose, education should be promoted by every possible means, and no reasonable expense spared to attain this most valuable object; for it is the moral power of a state, as agriculture is its physical one. For this reason, the advancement of learning and the most durable amelioration of the soil, should be the great objects of our unremitted efforts. By these means only can we ever be powerful and retain our present property, nay, our independence. This, we are satisfied, cannot be done without the fullest co-operation of our richer and more intelligent class of citizens. Even though the immediate and direct improvement of this class should not follow such efforts, yet the trial should be made. Advance rural science, and every inhabitant will be benefited; for there is really only one prominent interest in this state, and that is agriculture. The others are all dependent upon it. It appears to us, gentlemen, that the administration, or rather the constitution of our state government, is defective in its arrangements; and we throw out the hint, that it may be duly considered. It seems to us that every department of our interest should have a competent officer at its head. In our financial department, we have a comptroller and a treasurer. Why should we not have a minister of instruction and one of agriculture? These two most essential officers, if well chosen, would undoubtedly superintend their respective departments to the great advantage of the state.

We need principally knowledge and population, and from any degree of increase of them, a proportional increase of wealth is the necessary consequence. With these, and the exertions we are capable of, we could defy the wors' efforts of our enemies, and rise triumphant from the conflict. By industriously spreading knowledge among our planters and farmers, we shall so increase the fertility of our soil, that our citizens will cease to look westwardly for rich lands, and patriotism, aided by self-interest, will save the country.

The first stage towards the accomplishment of this most desirable object is the inquiry, 1st. Whether our soil needs, and is generally susceptible of the improvement possessed. 2d. Whether we really possess the materials to effect it; and 3d. Whether these materials are to be obtained generally, at such a moderate expense, as to warrant the undertaking.

To answer the first query, to the satisfaction of reasonable men, we must show—that it has been done on similar lands in other countries. This we shall endeavor to do very briefly. The very few scientific examinations and analyses of our various soils, leave us but a narrow field for our research: but, by a comparison of the soils of this state with those in similar situations below the falls of the rivers in Virginia, Maryland, and other states, where the soils have been analyzed, we are warranted in asserting that they are similar—and in the two states named, such lands have been vastly improved by the means here proposed; for they were generally found deficient in calcareous earth, except in extensive beds of shells below the surface. Our worn-out fields may also be deficient in vegetable matter; but this is so easily supplied from the leaves of our forests, the inexhaustible beds of vegetable earth in our swamps, along the margin of all our water courses, from the spring branch to the largest river or bay. It may also be had in such abundance from every pond, and the steep sides and bottoms of every rising ground, that we may say that every man has at hand the means of supplying this deficiency. It is somewhat different, however, with the supplies of calcareous matter. But this is the object of the second query.

The immediate vicinity of the sea has the advantage, besides sea-ooze and sedge, of fresh shells, which may either be pulverized by burning, or which would be far more beneficial, though, perhaps, more expensive, by being coarsely ground immediately before they are spread on the land and ploughed in. By the process of burning, all the animal matter of the shell and of the animal it contained, are lost, and the lime thus produced, is, perhaps, not so generally fit for all kinds of land as the other, unless it is exposed a long time to the air to regain the carbonic acid of which the fire has deprived it. Lime in a caustic state, however, is sometimes preferable to the carbonate; as when it is to be applied to land overburdened with coarse vegetable matter, as is the case with land uncleared or which has just been cleared. For all the other lands, the chief dependence is on the great deposites of fossil shells, which are visible on the surface, in some places, and in others on the banks of rivers, creeks, gulleys, and such other places. Great strata of them are known to exist from the sea-board up to Orangeburg, or above, in the direction of Columbia. When we shall be fully impressed with the immense value of these deposites, and search for them, many localities of them will undoubtedly be found in favorable situations. Wherever they have been used in similar situations as the tract of country in contemplation, most of these beds of shells have been found inexhaustible. Parts of the upper country is abundantly supplied with calcareous matter in its marbles and lime stones. The materials are then to be had in abundance.

To answer the third query, we must inquire into what has been done in other countries or states, and what is usually the expense.

We have, on this subject, the undoubted testimony of almost every European writer on agriculture. In those countries, carbonate of lime, in the form and by the name of marl, has been used to restore fertility to land from time immemorial. Lime, in a caustic state, has also been much used for the same purpose, and when applied with judgement, the result has always been satisfactory. Sir H. Davy says, (p. 182.) in his Agricultural Chemistry: "The labour of improving the texture or the constitution of the soil, is repaid by a great permanent advantage, less manure is required, and its fertility insured; and capital laid out in this way, *secures forever, the productiveness, and consequently the value of the land.*" Also, in another place, (p. 164:) "The soils which contain the most alumina and carbonate of lime, are those which act with the greatest energy in preserving manures. Such soils merit the appellation which is commonly given to them of rich soils; for the vegetable nourishment is long preserved in them, unless taken up by the organs of the plants." James Anderson, L. L. D. in his Essays relating to Agriculture, &c. says, (p. 169:) "Lime is the most universal manure for unproductive land. Of all the manures that can be obtained for improving waste lands, nothing is equal to lime, or other calcareous matter." And in p. 198: "I scruple not again to repeat, for it cannot be too strongly inculcated, that lime, or other calcareous matter, applied in large quantities, must form the basis of all radical improvements of waste lands. Lime tends to sweeten the grasses, produced on every soil, to which it has been applied, so as to render them more palatable to all animals; it augments the quantum of the produce considerably; it thus renders the ground capable of sustaining a greater number of beasts. These, of course, produce more dung, and that dung if applied in conjunction with the lime, will produce greater and more lasting effects than it could have done without it. It would seem that heaven with a view to reward the industry of man, and to set no limits to the melioration of the soil, had disposed this universal fertilizer over our globe, as to bring it within our reach, by the exertions of human industry, almost every where. Whatever, therefore tends to facilitate the acquisition of this manure to any particular place; whether by means of roads, canals, or any other device, must be considered as amongst the most useful of human exertions."

The quotations, from these two writers must suffice, although numerous others, both from Great Britain and the continent, might be advantageously added, were it not for the fear of rendering this memoir much too voluminous. We cannot, however, refrain noticing something of this kind of improvement, that has been lately, and is now going on in increasing progress in some of our sister states, principally in Virginia. That most interesting work, lately published by Mr. Edmund Ruffin, of Virginia, entitled an "Essay on Calcareous Manures," second edition, together with his most invaluable monthly periodical, the "Farmers' Register," (publications which ought to be in the hands of every planter or farmer that can read) have already produced in the short space of little more than two years, very great improvements in the state of Virginia. These works give such undoubted proofs of an increased zeal, in the planters and farmers of that country, as redounds, not only to their honor, but also greatly to their profits. Wherever it is found practicable, the beds of fossil shells, are sought for, and transported on the worn-out or even on fresh lands, at an expense which may appear great in this country, where we are unused to such exertions, but in reality small when compared to the great increase of the crops. By means of these calcareous materials, fields which formerly produced eight or ten bushels of corn to the acre, and other grains in the same proportion, produce now thirty or more, and the land is thereby made fit for the production of wheat and clover, followed by another crop of corn or cotton. We cannot here enter into details, although they are most interesting; but we should not be doing justice to our subject or to our country, were we to neglect the mention of another very great advantage which is found to be derived from the same application of calcareous earths to the land, and that is, that the health of the country has been considerably improved by it. The short time that this invaluable manure has been used in the low country in Virginia and Maryland, does not only afford the most positive evidence of the permanence of this last mentioned benefit, but, from analogy, we are warranted in our hopes of the most permanent advantages from it.* The city of Mobile, from being some years ago, a very sickly place, is now, and has been for a few years, a most healthy one. This is chiefly to be attributed to the paving of its streets with shells, and the filling up of the sunken and marshy places, and covering them with the same materials.

The use of lime in its caustic state for the purpose of disinfecting cemeteries, butcher-pens, &c. has been known from time immemorial; but that these great benefits could be extended over a large extent of country, seems a discovery that had been reserved for our own times. It is found that the carbonate of lime possesses this disinfecting power in at least as high a degree, and is preferable to the caustic lime, except when it is desirable to consume the noxious, putrescent matter. The greater cheapness of the carbonate may render it useful with that view alone; and may be used to cover battle-fields, which besides the butcheries they have witnessed, frequently produce diseases in the country around. It is some-

*It is with sorrow and shame that we offer to correct the mistake which the author of the report has fallen into, and which has caused him to extend general eulogy where it is so little deserved. It is perfectly true that all the beneficial results of the use of marl spoken of above, have been obtained, and to the fullest extent, by many individuals in both Virginia and Maryland. But it must also be admitted that a far greater number in both these states, and still more in North Carolina, who possess equal means for availing themselves of this source of fertility and wealth, have either neglected it entirely, or used it very partially. Ed. Far. Reg.

what singular, that this most interesting fact was discovered in Europe, about the same time, that it was announced here, by Mr. Edmund Ruffin, as we find at the very moment we are writing this, in his Farmer's Register for November.

An obvious question here intrudes itself. Can this be true? Has lime either caustic, or as a carbonate, the wonderful effect of destroying the effluvia of putrefying vegetable or animal matters, which are considered as the greatest cause of bilious diseases? We then ask emphatically: is it true that lime is used effectually, in preventing the bad smells arising from offensive places, from the receptacles of filth—has it not for centuries been the practice of throwing lime over the corpses that were buried in churches to prevent infection? Can we doubt the fact related by Mr. Ruffin, in his "Essay on Calcareous Manures," of an experiment which he has made, of covering the carcass of a cow, which had died in hot weather, with calcareous earth or fossil shells, by which all offensive smell was prevented, and all the gases produced by the putrefaction of the carcass, were evidently absorbed by the carbonate? Can we doubt the experience of ages on a point connected with this subject? If all this be true, it must necessarily follow, that the same means used on an extended scale must produce a commensurate effect. Now that we have a clue to guide us in our reasoning, may we not fairly attribute the well known healthiness of the town of St. Augustine, to the same cause. A considerable part of its vicinity is covered with shells, its houses are formed of a stone which is composed of small shells, and its streets are paved with the same materials.

Persons who have not extended their views on this subject, far and near, can scarcely have an idea of the vast and multifarious advantages, that can be derived from a plentiful use of calcareous matters in agriculture. It is well known that many valuable plants grow thriftily, only on soils either naturally calcareous or artificially made so. Among them we shall only notice such plants as bear papilionacious flowers. Of this class are lucern, clover, &c. It is frequently asked why these two most valuable plants will not thrive in this state. The fault has been sometimes attributed to the great heat of our summers, to the long droughts which frequently occur here, when these plants are parched and killed. It is most probable that the true answer would be, that our soil is too deficient in calcareous matter. The temperature of the state of Virginia, at an equal distance from the sea differs very little from that of our state; and clover grows well there in suitable soils. It is, moreover, most positively ascertained, that calcareous lands are much less affected by droughts, or by too much rain than others. It seems, then, most probable, that we have it in our power to cultivate here these two grasses, and have our clover fields as well as our neighbors; from which they derive almost incredible benefits. By means of clover, they are most undoubtedly enabled to enrich their lands, to any extent they please, according to their industry and intelligence. After clover, cotton, corn, or any other grain, grows admirably well. These advantages are truly incalculably, and they are, at least, to a certain, if not, to the fullest extent, most unquestionably within our reach. We need but will it, and put our shoulder to the wheel, and we are in the enjoyment of them.

It is certainly with exceeding regret that we feel ourselves compelled to exhibit the state of our agriculture in such an unfavorable light; but the truth must be told. We are most fortunately, at present, in a state of peace; and therefore, of prosperity; but we act as if this state of things could not possibly ever be changed. With an abundance of fertile soil, we are dependent on others for our bread and meat, as also for our riding and carriage horses and working mules. If our ports were now to be blockaded by an enemy, we should be in a sad predicament, without either bread or meat in the state sufficient for its own support. It is true, that our neighbors would furnish us with these articles of first necessity; but it could only be at such prices as would make both the rich and the poor suffer. This should not be.

Respectfully submitted by

N. HERBEMONT,

Chairman of the Committee on Agriculture.

ROCKBRIDGE AGRICULTURAL SOCIETY—SILK CULTURE—INTERNAL IMPROVEMENTS OF VIRGINIA.

To the Editor of the Farmers' Register.

Rockbridge Co. Dec. 28, 1835.

* * * * * Like every thing of the kind in Virginia, our Ariculturaal Society drags on a feeble existence. But under the auspices of its present officers we hope to revive into usefulness. Though the exhibition of stock at our last meeting, was not very creditable, that of domestic manufactures was highly so, particularly the Venetian carpeting, counterpanes, and table linen. A few dozen skeins of beautiful domestic sewing silk, were also exhibited by Miss McClure, of this neighborhood, of various colors, and all of native origin. There cannot be a doubt that our climate and soil are perfectly adapted to the growth of the mulberry, and the rearing of the silk worm. And if the delicate and feeble portion of our population could be induced to turn their attention to the silk culture, and that of the grape vine, a new source of wealth would soon be opened, and the temptations to encounter the pestilence and the privations attending a removal to the far west, greatly diminished, if not entirely removed. This is a result ardently to be desired by every friend to the ancient dominion; and I doubt whether in addition to a more energetic system of internal improvement, it would not be good policy to extend legislative aid to this new source of wealth in the shape of premiums, or otherwise. By the by, what has our Committee on Agriculture in the legislature, been doing for the last few years, to advance the cause? Would it not be well to call their attention to this subject?

There seems to be a growing disposition in the lower country to start a rival improvement (in a rail road from Richmond to Lynchburg) to that of the James River Canal. Can it be possible they seriously contemplate doing the stockholders of that company such injustice? But it would be impolitic, as unjust, because, with the present resources of the state both cannot be carried on with zeal and energy, and it would probably be after half our population had moved off in despair, that either would be brought into a feeble existence. If the original design was to tap the Valley, and afford a cheap and sufficiently speedy conveyance for the immense resources of this, and the country west of us, no scheme could be devised more likely to effect this than the one contemplated by a continuous canal to Covington—or if the funds of the company are insufficient, to Buchanan at least. And many cogent reasons could be given, why this last named point should be the *terminus* of the great Nashville rail road. I will merely remark, that such articles as plaster, salt, coal, marble, lime, and perhaps limestone and granite, and pig metal, will not very well suffer transportation any great distance on rail roads, and there is no point where the salt and plaster of Washington and Smythe, could strike the James River improvement so cheaply, or at so short a distance, as at Buchanan.

Whilst on this subject, I am reminded to beg your aid to a turnpike we have in contemplation from the present termination of the Lynchburg turnpike at the head of the Blue Ridge canal, by the way of the Natural Bridge and Dibrell's Sulphur Spring to intersect the Covington turnpike at Clifton Forge, on Jackson River. This will afford all from the lower country desirous to visit the mineral springs of the west, by far the most direct, romantic and picturesque road—and indeed, on every account, the most eligible road that can be selected.

ROBERT R. BARTON.

From Chaptal's Chemistry Applied to Agriculture.

OF THE EFFECTS OF THE NOURISHMENT OF PLANTS UPON THE SOIL.

It appears to be clearly proved, that plants imbibe from water and the atmosphere, only carbon, oxygen, and hydrogen; but analysis shows us that, independently of these principles and the products arising from their combinations, plants contain azote and some earthy and saline substances, which cannot be produced by either of the three elements mentioned above. It remains then for us to inquire, in what manner these substances have been introduced into plants.

Azote, which is found in the albumen, the gelatine, and the green coloring matter, is not sensibly drawn from the atmosphere, though it constitutes four-fifths of it, but passes in with oxygen in the water imbibed by plants, and like that, is separated in their organs.

The earths which are insoluble in water, but which are mixed with, or suspended in that fluid, are not absorbed in large quantities by the pores of plants but may be conveyed into them by the aid of some chemical agents, as the acids, the alkalies, &c. Besides, if we observe attentively, we shall find that these substances do not abound in plants; and we can easily conceive, that the little they do contain, might, in a state of extreme division, be introduced by water.

There are some plants that fasten themselves and grow upon the most barren rocks, deriving from the surrounding air, and from rains, all the nourishment required by them; of this number are the mosses, the lichens, and fleshy plants. Their growth is slow, their transportation almost nothing, and their color remains nearly the same all the year round: so that they constantly absorb water and carbonic acid, and assimilate their constituent principles.

The soil is always exhausted, in a greater or less degree, by the plants it produces: and much more by those that are annual, than by those that are perennial. Air and water alone do not afford a sufficient degree of nourishment to plants, for when they have been made to grow in well washed sand, watered with distilled water, though they have flowered, their fruits did not arrive at maturity. Experiments to this effect have been made by Messrs. Giobert, Hassenfratz, de Saussure, &c.

Those annual plants which transpire most, generally exhaust the soil in the greatest degree. Peas, beans, and buckwheat, though they have succulent stalks, exhaust it least, because they transpire but little.

When annual plants are cut at the time of flowering, they do not exhaust the soil, as their succulent roots furnish materials for replacing the loss occasioned by their growth; but after having produced their fruits, the soil derives but little advantage from the dry fibres which are the only remains of their stalks and roots.

During fructification, plants absorb but little nourishment from the soil; the supply necessary to the formation of the seed is furnished by those juices which already exist in the roots and stalks, and this occasions them to become dry and exhausted, so that, when the fruit is perfected, the roots and stalks consist only of woody fibres. It is necessary that this fact should be known, in order that too late mowing of meadows, whether natural or artificial, may be avoided. The most favorable period for cutting grass is that of its flowering; if the operation be postponed till the seed is formed, two great disadvantages will arise; the first is, that fodder obtained will have parted with the greater portion of its nutritive qualities; and the second, that the plants having fulfilled all the laws of their nature, by providing for their reproduction, cannot flourish again with vigor during the same year.* In support of this doctrine, I will mention one well known fact, which is that meadows mown before fructification afford the most abundant harvests, and the gratest number of them, as they may be mown several times in a year. The perennial plants which serve as fodder, may by this means be preserved for several years in a state of reproduction; but if mown after the formation of seed, the plants are weakened and the production is lessened. All farmers know, that when they subject to tillage a piece of artificial grass land, which has for several years been constantly mown at the time of flowering, it will yield several harvests without any dressing; but if

* This holds good only in part in regard to timothy (*Phleum pratense.*) According to Sinclair, this grass contains more than double the nutriment when in seed than when in bloom. At the same time the remark of Chaptal is correct, that the root is much more exhausted by maturing seed—the aftergrowth is comparatively trivial, and the subsequent crops are diminished. By cutting rye in flower, or before, which is either annual or biennial, it may be almost rendered perennial, as we have witnessed, in sowing it with lucern. We have observed the same fact in regard to many garden productions—whose existence and vigor are prolonged by preventing the formation of the seed.—*Cultivator*.

the grass has been left to go to seed, it will be necessary to supply the earth with manure before it will yield a good return. As those plants that are cut at the time of flowering do not exhaust the soil so much as those that remain for seed, the belief has arisen among farmers, that before the period of fructification, they are nourished by the constituent principles of the surrounding air and water; but that during the time of the formation of the seed, their support is almost wholly derived from the earth. But this opinion will not hold in regard to all plants; lettuce, turnips, tobacco, woad, endive, cabbages, and onions, exhaust the soil greatly, though they are gathered before producing seed. Potatoes, though they produce but few seeds, impoverish land more than almost any other vegetable. Plants raised in a nursery, and afterwards transplanted, exhaust the soil in which they spring more than the one in which they complete their growth.

Thus we see, that during the whole time of their vegetation, plants derive their nourishment from the air and from the substances contained in the earth; but if they are mown at the time of flowering, they leave in the soil their roots and portions of their stalks, which restore to the earth nearly as much as they received from it: while, if they remain uncut till they have completed their course, they return little or nothing to the soil to compensate it for the nourishment they have received from it.

It is well known to farmers that ploughing in a green crop of any kind whatever, prepares the soil for producing well without any other manure: since, by this process, all that the soil has yielded is returned to it, with some additions resulting from the decomposed principles of air and water, which are contained in the plants.

In order fully to understand this doctrine, which appears to me of great importance to agriculture, it is necessary to consider the successive changes which take place in annual plants during their growth; first, they produce green leaves, which, by coming in contact with the air, receive from it the principles of which I have spoken: subsequenly the stalks increase in size and number, and are covered with numerous leaves, which absorb from the atmosphere a degree of nourishment suited to the increasing wants of the plants; the strength, fulness, and depth of hue of the leaves and the stalks, particularly of the latter, increase in proportion to the richness of the soil.

This state continues till after the period of flowering, when a change, worthy of note, takes place; the roots dry up, the stalks wither and change their color; and when fructification is at length completed, both roots and stalks have become mere skeletons, which answer but little purpose either for nourishing animals or manuring earth. During this period of vegetation, what becomes of the juices that were so abundant in the roots and stalks? They have been consumed by the formation of the seeds. It is undoubtedly the case that plants still continue, during fructification, to absorb some portion of their nourishment from the air and soil; and this assists in the formation of their seeds: but by far the greatest share of the formation of these is owing to the deposites contained in the organs of the plants.

The same holds true of perennial plants: and it may be observed, that when a tree produces fruit too abundantly it becomes exhausted and dried, and bears only that which is small and misshapen. The difference between annual and perennial plants is, that the former die as soon as the process of fructification is completed; while the latter preserve their leaves green and their roots fresh, for the purpose of absorbing new portions of nourishment, to be deposited in their vessels for food when the returning warmth of spring shall cause them to require it.

M. Matthieu de Dombalse, one of our most enlightened agriculturists, has confirmed by experiments, the doctrine I have here advanced. On the 25th of June, 1825, at the time of flowering, he selected, within a small space, forty wheat plants of equal size and strength, each having three stalks bearing heads: he pulled twenty of the plants with all their roots, and left the rest to complete their fructification. Having carefully freed from earth the roots of those he had taken up, he cut the stalks two inches above the base, and dried separately the roots, and the stalks surmounted by their heads.

The roots and the portion of the stalks remaining with them weighed, grains - -	647
The stalks, heads, and leaves, - - -	1946.5
Total, - - - - - - -	2593.5

On the 25th of August, the time of harvest, he plucked up the twenty plants which had been left for seed, separating the roots and cutting the stalks as of the first; of these the weight was as follows:

	Grains.
Roots, - - - - - - - - - - - -	419.53
Straw, husks, and beards, - - - -	1318.75
Grain, - - - - - - - - - - -	1025.69
Total, - - - - -	2763.97
During these two months, the roots and the portions of stalks adhering to them had lost, - - - - - - - - - - -	237.52
The stalks, head, and leaves had lost -	624.67
Total loss, - - - - - -	862.19

But as the seed weighed 1025.69 grains, the whole had increased in weight 160.47 grains, Troy. From this experiment we may conclude, that the juices contained in the plants, at the time of flowering, contribute to the formation of the grain in the proportion of $\frac{86219}{102569}$, and that the excess of the weight of the grain which is $\frac{16047}{102569}$ arises from the nourishment which the plants absorb from the air or soil, during the two months of fructification.

If the wheat is mown when in blossom, it leaves in the earth, to be converted into manure, a quarter part of the weight of the plant; but when it is reaped after having come to maturity, there remains only one-seventh; and this last residue is worthless as manure in comparison with the first; this contains almost nothing but carbon, while that is rich in juices and in decomposable matter. Thus we see that those plants which form seeds exhaust the soil most, because for all they have received they return nothing but their dry roots and stalks; while those that are cut when green give back with their roots and stalks what they have drawn from the soil, and a part of that which they have drawn from the atmosphere.

The nutritive principles contained in the soil pass into plants only in a state of solution, or of extreme division in water. Healthy plants absorb from preference those salts that are most congenial to them; but if waters be charged with salts unsuited to their natures, they absorb the fluid and reject the salts till the water becomes thickened by them. There are some salts which enter naturally into the composition of certain plants; the pellitory and nettle, for instance, which grow upon the borders of the sea, contain muriate or sulphate of soda: these vegetables, transported into other soils, afford no vestige of these salts, and their growth is vigorous. M. le Marquis de Bullion has proved that the turnsol, raised in earth containing no nitre, does not, upon analysis, afford a vestige of any: but that plants of the same kind, raised in the same soil, but watered with a solution of nitrate of potash, are charged with that salt.

Generally speaking, a superabundance of salts, especially if they be of kinds very soluble in water, injures vegetation; this is particularly the case when the salts are not such as enter naturally into the plants, among the number of their constituent principles. Salts of foreign natures cannot be useful, excepting as they may serve, in very small quantities, to excite and stimulate the organs of plants. The great value of sulphate of lime as a manure, is owing to its insolubility, which allows water to contain but a very small portion of it at once; so that it passes into plants very gradually, and thus its effects are prolonged for several years: till, as I have before observed, the soil is exhausted of it.

The quantity and quality of the salts contained in plants may be ascertained by an analysis of the ashes arising from burning them in a dry state. It may not be useless to mention here some facts which may throw light on this subject.

Kirwan and Ruckers have proved, that an equal weight of herbaceous plants furnishes more ashes than of ligneous plants. M. Pertuis has found, that the trunks of trees afford less ashes than the branches, and these last less than the leaves. Evergreens yield less ashes than trees and shrubs that shed their leaves in autumn. On the other hand, Hales and Bonnet have observed, that the perspiration of herbaceous is greater than that of ligneous plants, and that that of evergreens is less than that of plants which shed their foliage. These circumstances may explain why some plants afford more ashes than others. The water which is evaporated by transpiration deposites in the cells of the plant the salts which it had held in solution, and is replaced by a new quantity, which is in its turn thrown out, leaving behind it an additional portion of salts; so that those plants, and those portions of the same plant, which transpire most, must necessarily contain the greatest quantity of salts.

The salts and earths contained in plants are of the same nature as those existing in the soil in which they grow, but not, according to analysis, in the same proportions; because the plant absorbs more or less of them according to its own nature and their solubility. It cannot, however, be strictly said, that all the salts contained in plants existed previously in the soil, as some neutral salts are evidently formed within their organs; such are those of which the acid is known to us, and particularly those that contain in their composition a vegetable principle: of this sort are the acetates, the malates, and the citrates. The salts do not exist after the burning of the plant, because their acid is decomposed by the action of fire, and there remains only the base, which is usually potash or lime; but an analysis of the plant "by *the wet way*" gives proof of their existence.

It is even possible in some cases to follow the formation of the acid, by observing the progress of vegetation, and the changes produced in its products. Of this I will mention one example, Beets gathered late in autumn, in the north of France, do not yield the same principles as those gathered at the same period in the south of France; the first contain sugar, the second saltpetre. According to the experiments carefully made by M. Darracq in the department of Landes, the best roots of the south yield as much sugar in the month of August and the earlier part of September, as those of the north; this sugar then is replaced by saltpetre, of which the acid is formed during the progress of vegetation. It has been observed, that beets containing sugar frequently underwent a change during the winter by which the sugar entirely disappeared, and was replaced by saltpetre; in this case we can almost follow with the eye the process of decomposition. The juice of beets in which the change has commenced, when thrown into the boilers, becomes covered with a thick, white foam, which gives out a reddish vapor of nitrous gas; in this state the labor of extracting sugar becomes very difficult; the sugar crystalizes badly, and the proportion of molasses is very great. It may be seen clearly, that in this state oxygen is already united in the beets with azote, and that only an additional portion, which would be gained during the progress of change in the roots, is wanting for the formation of nitric acid; this combined with the potash, which is contained in these roots in the proportion of 1.100 of its weight, would produce saltpetre.

If we observe a plant during the various stages of its vegetation, we shall perceive at these different periods very remarkable difference in the odor, taste, consistency, &c.; from this circumstance we must suppose that it forms new products, new combinations, and consequently new salts.

The alkaline salts are the most abundant in green herbaceous plants. M. de Saussure has observed, that the ashes of young plants that grew upon a poor soil, contained at least $\frac{3}{4}$ of their weight of alkaline salts, and that those of leaves of trees which grew from their buds contained at least $\frac{1}{2}$.

The proportion of alkaline salts diminishes in proportion as the plants advance in age; this remark applies equally to annual plants and to the leaves of those trees that shed their foliage in autumn. The ashes of seeds contain a greater proportion of alkaline salts, than those of the plants that produced them.

These facts are very important to those who are engaged in the manufacture of salts furnished by the combustion of vegetable substances; since they show clearly that it cannot be equally advantageous to them to consume all sorts of plants, nor at all periods of their growth.

Next to the alkaline salts, the earthy phosphates of lime and magnesia are the most abundant in plants, and like the first, these diminish in quantity in proportion to the age of the plant. Plants also contain, but in very small proportions, silica, and some metalic oxides, especially those of iron.

From the Lynchburg Virginian.

AN ESSAY, READ BEFORE THE AGRICULTURAL SOCIETY OF ALBEMARLE.

In obedience to a resolution of the society requiring of me an essay upon some agricultural subject, I shall proceed, hastily to give, first, some general views on the subject of ploughing. Deep ploughing, is certainly the first great step towards improvement: it not only facilitates the improvement of the land, but it is a safeguard against the drought, and also the washing rains of summer, which we often suffer from—especially the corn crop. But the great advantages resulting from deep ploughing do not stop here—by it, you bury all seed injurious to the land and crop so deep, that they never vegetate, leaving a clean surface for the seed sown. Good ploughing, however, cannot be done, without good ploughs, of which we have very few. The M'Cormick plough, when well made, is a good plough for light foul land, but it has not sufficient strength for rough, or turfy land; and I have never seen one that would stand a draught of three strong horses, and that would not get out of order in one season, and often in one day.

The plough which I think best adapted to our soil, and would recommend to the society, is the bar-share. I have used this plough for more than thirty years, and I believe the improvement of my farm is more indebted to good ploughing than any thing else. I will endeavor to exhibit one for the inspection of the members of the society, and would urge them to adopt some mode by which they could be produced. The bar-share has many advantages over any other plough—one great advantage is the coulter, another is the peculiar shape of the mould board, which does not offer so great a resistance to the surface, and at the same time turns the soil more effectually. I have been ploughing from eight to twelve inches deep with this plough ever since I have been farming, without ever in one single instance injuring my land, but on the contrary, greatly to its improvement.

There is however, one great mystery with respect to deep ploughing, which I have not been able to solve to my satisfaction, and which I would like some of the members of the society, more conversant with the subject than myself, to explain; it is this—no matter how much clay you turn up in flashing your land, in one season it all disappears, and you see nothing but good soil again upon the surface. One more observation upon the subject of deep ploughing, and I shall then pass to another important subject connected with agriculture. It is certainly very desirable to have a deep soil for profitable cultivation, and if nature has not provided it, art must be resorted to. Long experience has convinced me of this fact, that just as deep as your plough goes, so deep will your soil be.*

I will now submit a few remarks on the second step towards improving—that is, the carefully making and taking care of manure. How few of us make one-half of what we might, and how very important an item it is, in the account of farming. There are many opinions as to the time, and mode of using it. Convenience has always dictated the time, the quantity being the greatest object with me. I have always thought it unimportant whether you make use of it on the surface, or plough it under. By using it on the surface, the first crop derives a greater benefit from it than by ploughing it under—but by ploughing it under, the second and succeeding crops derive a greater benefit, than by using it on their surface, and is to be preferred, except for the wheat crop, which I think best to harrow in with the wheat. One advantage, however, of the surface mode, is, that the clover is more apt to succeed well, on soils not particularly kind to the production of that invaluable crop. As there are other subjects to which I wish to call the attention of the society, I should be consuming more of its time than the present occasion would admit of, were I to dwell more lengthily upon this important branch of my essay.

I would now invite the attention of the society to the great advantage to be derived from having a farm entirely rid of all pests to which our soil is so liable. Long experience has proved to me, that a farm of this character, may be worked to a greater advantage with almost half the number of hands, than one infested with pests, such as thistle, mullein, St. John's wort, wild carrot, and many others, not less objectionable and equally injurious to the land. The remedy which I have adopted is to keep a large stock of cattle. I am very well aware that this is considered by many (and some judicious farmers too) as bad management; but I have found that my farm, if not improved as fast, is at least clean, and improvement is facilitated; and, it is in fact almost the only mode of getting rid of the *sassafras*.

Another very important subject to which your attention is invited, and one attended with economy to the farmer, (which is certainly an important consideration and recommendation to any plan connected with the operations of a farm) is that of stone fencing, which is indeed "killing two birds with one stone:" for while you are moving a great pest, you are securing to yourself a lasting fence, and one that is no inconsiderable ornament to your farm. My farm is nearly half enclosed with a fence of this kind, and I find it much cheaper than cutting and hauling rails every few years. There are a great variety of opinions as to the best mode of constructing a stone fence—but I have found the following to be the most durable, or, in other words, least liable to tumble. It is of course important to give the stone work depth of foundation sufficient to place it beyond the influence of the frost. The fence should be eight feet wide at the base, and three feet high, and from six to eight inches on the top; upon this place a lasting rail either of chestnut or heart pine. At intervals of eight feet, I let into the ground locust stakes, on both sides inclining to the wall and crossing on the rail: in the lock or cross of the stakes, another rail is placed, which keeps the entire fence perfectly secure; a fence on this plan, may be said, to be "as lasting as the hills."

Observing some time since a piece from the Gen-

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* These remarks are doubtless correct as to the red lands of Albemarle, which possess such rare and valuable qualities. But they would not apply to shallow soils incumbent on a steril subsoil, whether of sand or clay.—Ed. Farm. Reg.

esee Farmer, on fattening hogs with apples, I was induced this year to make a trial of it, and I now take pleasure in communicating the result to the society. In June last my hogs were poor and diseased. I put them into my orchard to let them get the benefit of the apples, and to my agreeable surprise, in a few weeks, my hogs in the orchard were much fatter than those which had been fed on corn, and continued to thrive until they were entirely fat, not having had one grain of corn—and I would venture at this time, to challenge a comparison with any lot of hogs that can be produced.

I sincerely hope that others may be induced, from this experiment, to turn their apples into pork, instead of permitting them to fall and rot upon the ground.

I conclude my humble contributions to the society, by offering to you, gentlemen members, my unfeigned thanks for the honor you have conferred upon me.

JOHN H. CRAVEN.

From the Silk Culturist.

PROFIT OF A HEMP CROP COMPARED WITH SILK CULTURE.

We are indebted to the politeness of Samuel Chew, Esq., of Lexington, Kentucky, for an estimate of the cost and profit of a crop of hemp, coupled with a request that we will compare it with a silk crop in New England. We cheerfully comply with the request, prefacing, however, the remark that from the rich bottoms of Kentucky, a much larger crop of silk may be expected than from the ordinary land of New England. With respect to the labor necessary for a hemp crop, Mr. Chew says: "I wish very much for a fair comparison between the silk and our staple, which is hemp. I will give you the cost of an acre of hemp. As it takes the best land, the rent is

worth, - - - - -	$4 00
The land must be ploughed at least twice; the best farmers plough three times and harrow twice, which will take a team two days, at $1 a day, is	2 00
It takes one and a half bushels of seed, at $1 a bushel, - - - -	1 50
Cutting the hemp will take two days, at $1 per day, - - - - -	2 00
Tying it in bundles and stacking, one and a half days, - - - -	1 50
Spreading it down to rot, one day.	1 00
Breaking is always done by the short hundred, as we call it, of 100 lbs,	5 60
	$17 60
Five hundred pounds, of 112 lbs. to the hundred, which we sell by, is a good average crop to the acre, and $5 a hundred, may be called the average price for the last ten years, with the exception of the last, will give $25 as the product of an acre well cultivated,	$25 00
Nett profit,	$7 40

Seventy-five pounds being a man's task to break in a day, will leave us the above sum of $25 for fourteen days work; or $7 40, if we could hire the work done, which is nearly impossible, as it is very dirty, and so laborious that scarcely any white man will work at it; of course it is entirely done by slave labor. A stout man will make nine or ten acres, when well managed; and as it does not interfere with a corn, or scarcely any other crop, may make something besides. Thus you see, a stout man will make from two hundred and fifty to three hundred dollars. Negro women cannot labor at hemp at all, and are scarcely worth any thing. Although our crop does not appear so visionary as your silk crop does per acre, from your least calculations of from one hundred and forty, to five hundred dollars; yet as a whole, will it be as good as hemp to slave holders? If near it, I assure you, I for one, will quit hemp. I wish a fair comparison, and if it cannot be obtained through the medium of your paper, how am I to obtain it?

We have long been of the opinion that the culture of silk is peculiarly adapted to slave labor, especially females, infirm male adults, and children of both sexes. Little muscular strength is required, and no more judgement and skill than ordinary negroes may exercise under the care and direction of a judicious and attentive overseer. With respect to the comparative profit, we would refer Mr. Chew to the communication of Messrs. Cheney in the last No. of the Culturist. According to their estimate, 14,000 Chinese plants of two years growth to the acre, would furnish 35,000 lbs. of foliage, which would be sufficient to make at least 350 lbs. of silk, worth, after deducting the expense of reeling $1050. The labor necessary to attend a family of worms sufficient to make that quantity of silk could not exceed 230 days, which being estimated at a dollar a day, and deducted from the gross amount would leave a nett profit of $820. The experiment of those gentlemen has not been completely tried, yet we have little doubt of the capacity of the lands and climate, of Kentucky, to produce it.

We see no difficulty in the way of a successful prosecution of the culture of silk in connexion with the culture of hemp, on the Kentucky plantations. The silk crop is not commenced until some time after the time of sowing hemp is passed, and it is finished before the hemp crop is ready for harvest. Help also which would be worthless on the hemp crop may be profitably employed on the silk crop, and the nett income of the plantation is thereby astonishingly increased.

From the Silk Culturist.

LABOR REQUIRED FOR SILK CULTURE.

It is difficult to make accurate estimates of the labor required in feeding and attending a family of silk worms of a given number; as there are several circumstances which tend to increase or diminish it materially—such as the distance the foliage is from the cocoonery—the size of the trees and the quantity of their leaves—the variety of the tree, whether Chinese or Italian, &c. &c.

The following estimate, however, has been made, by a correspondent of the New York Farmer, which may be regarded by the culturist as accurate as any thing he can find on the subject, short of actual experiment. "The labor required to attend 1,000,000 worms would be, the first week, two persons; for the second, four; for the third, eight; for the remaining two, fifteen or twenty." This will make an aggregate amount of 324 days necessary for a family of this number. The same writer estimates the product of this number at 500 pounds, which, at present prices, cannot be estimated at less than $3 a pound, after deducting the expense of reeling.

If these statements are to be relied on, it will be easy to calculate the nett profit which may be expected from 1,000,000 worms. The gross profit being $1500, the expense of the labor is to be deducted. Calling this a dollar a day, which is the highest it can be called, it will amount to $324, which being deducted as aforesaid, would leave a nett profit of $1.176. But when the fact is taken into consideration, that most of the labor can be performed by boys and girls, and aged women, its expense will be materially diminished, and the profit proportionably increased.

From the Silk Culturist.

PRICE OF MAKING COCOONS.

In most of our estimates of the profits of a mulberry plantation, we have put down the labor of making silk at three-fourths of its value, and in no instance less than one-half. A few days since a silk grower from Mansfield informed us that he was ready to contract for making cocoons at $1 a bushel, which is one third of the price they are now selling at the silk factory in this city. He remarked that he could furnish the help and make a fair profit at that price. From this statement it will be seen that foliage sufficient to make a bushel of cocoons is worth, on the tree, $2.00, and according to to the quantity ordinarily consumed in making a bushel, one and a half cents a pound. Taking this as the basis of a calculation, a farmer may readily ascertain the income he may derive from this source, without interfering with his other agricultural operations. The sale of mulberry foliage is a very important article of traffic in Europe and Asia, and we have no doubt, will soon be, in America. Every farmer who sets out mulberry trees will very soon derive a fair profit from them, though he may not be disposed to engage in the culture of silk. We hope no farmer will neglect to provide in this manner, a fund from which, both himself and his posterity may draw at pleasure.

TRANSACTIONS OF THE GEOLOGICAL SOCIETY OF PENSYLVANIA.

The second half volume of this work has recently been published, and is a splendid monument of the public spirit and liberality of the Society, and of the individual members of whose labors it records. We have learned, with more regret than surprise, that this very expensive publication has exhausted the funds of the Society. Compensation for even the pecuniary expense of the publication was probably not counted on, and will certainly not be found. But it well becomes every wealthy friend to science, and to the best interests of our country, to bear a small portion of this expense, and at the same time serve himself, by adding this valuable work to his library. We profess not to be able fully to appreciate the value of this and similar works, and unfortunately but few persons in Virginia, as yet, are much better informed on this very important branch of science. But all those who are as little instructed as we are, may profit well by an examination of this volume, even though the benefit be limited to their learning what vast and rich resources such investigations may present, and how greatly they are needed to bring to light the natural resources, and the (as yet) *dead capital* of every country, and none more than of Virginia. If more is wanting to induce Virginians to lend such slight aid to these noble efforts of the Geological Society, they may be presented in the fact that a large proportion of the papers are devoted particularly to the geology of portions of this state, and must serve greatly to develope our mineral resources and wealth. Especially, all individuals concerned in coal lands, and in mining of every kind, will find much interesting matter, and in many cases, in reference to their own individual labors, or possessions. It will be a laudable, though very small return for important value conferred by this Society, if the legislature of Virginia would purchase as many copies at least as to furnish one to every College and public library in the state. However small the means, this and similar measures would aid the most important public work now in successful progress, of a general geological survey of Virginia, by fostering the growth of a taste for such investigations, gaining favor for them from intelligent inquirers in all parts of the state, and by aiding and directing their examinations, might put to work hundreds of private individuals, who would gather and treasure up numerous facts, by observations made in advance, and yet essentially in aid, of the future examinations of the geological surveyor.

Besides other papers of general application and interest, the following are reports on subjects belonging to Virginia, and several of which required much time, labor, and science to investigate, and the results of which are here presented to the many who may profit by these gratuitous labors.

Memoir of a section passing through the Bituminous Coal Field, near Richmond.

Analysis of some of the coal of the Richmond mines.

Notice of a geological examination of the country between Fredericksburg and Winchester, including the gold region

Review of geological phenomena, &c. in two hundred and fifty miles of sections in parts of Virginia and Maryland.

Account of travertin deposited by the Sweet Spring waters (already re-published in the Farmers' Register.)

Observations on a portion of the Atlantic Tertiary region.

We shall hereafter extract some of the portions that may be found suitable to our work—though the choice will be very limited, owing to the necessity of our omitting the plates which are so often required for illustration, and with which the volume of Transactions is profusely and beautifully embellished. Some of the most expensive plates are representations of fossil bones, such as are often found by our marl digging farmers, but which are rarely preserved to aid scientific investigations. In this manner, many persons might easily aid the labors of the Society: and for this purpose we invite our friends, and especially our former neighbors, to take care of such fossil bones as may be found, of large size, or in an unusually perfect state of preservation, and to place them in our hands, to be sent to the Geological Society of Pennsylvania.

From the Magazine of Natural History.

EGGS PRESERVED FRESH BY LIME-WATER.

The method of preserving fowls' eggs in lime-water for eating is well known, but does not seem to be practised as it deserves to be. We are still using eggs at breakfast which were preserved in April last year; and they are as good as the day they were laid, retaining the milkiness and delicate taste peculiar to a new-laid egg. I had one, two days ago, marked "1st April" (then, of course, ten months and nineteen days old,) with all the characteristics of a newly laid one. It is lime-water, in fact, that we use, and the eggs are mostly warm when put into it. None of them are allowed to be twenty-four hours old: this is essential, I believe. The shells are liable to crack in the boiling; but the eggs do not burst; and [only] a very few of them have a slight curdy flavor, not unpleasant, however, to those who like new eggs.

A SUBSCRIBER.

Vale of Alford, Aberdeenshire, Feb. 22, 1833.

ON THE TILLAGE OF INDIAN CORN.

To the Editor of the Farmers' Register.

Montgomery Co. Md. Jan. 15, 1836.

I have observed several pieces lately in your valuable Register, on the cultivation of corn, and as they all differ from the system that I have been pursuing for several years with great success, I am induced to present it for the experiment of those who may not be so fortunate in their present practice. My farm of 520 acres is divided into seven fields, of about sixty acres each—one of which is put in corn—two are in wheat—one in rye—and three in clover—so that it will be perceived, that a field goes in corn but once in seven years—and my rotation of crops is such that it remains in clover and blue grass, with which, by this time, it becomes too thickly set for any other crop, two years, or eighteen months previous to its going in corn. I greatly prefer for corn, a field that has yielded no crop the year previous: it is more capable of sustaining the heavy demand that is required of it—and the sod, which if turned well under, will be decomposing throughout the summer, will tend to ameliorate the land, and contribute materially to the support of the growing crop. I prefer breaking such a field in the spring. If broken in the fall, it becomes too compact during the winter, and you must either cross-plough, or list in the spring, which brings the sod upon the surface unrotted—adds materially to the labor of keeping the corn clean when young, and defeats the other goods effects that I have stated would result from having it well covered. As early in the spring as the ground will admit, and I never plough when the ground is wet or heavy, I start two large three-horse ploughs, drawn by three strong horses—with directions, which I see executed, to my ploughmen, to plough as deep as the horses can draw the plough, and in every instance in which they skip a place, from the plough being thrown out by a stone, or other cause, to cut it on their return—being fully satisfied that the success of every crop mainly depends upon the preparation of the land previous to planting. After the field is broken, which takes from fifteen to twenty days, I start two large three-horse harrows, and harrow first the way it was ploughed, and then cross-harrow, which if the spring is favorable, prepares it as nicely as if intended to be sown in wheat. It is then laid off in rows four feet apart, which finishes the preparation for planting. I prefer *checked*, to either *step* or *drilled* corn, where the land is not too steep, because it enables you to substitute the plough for the hoe—a much more expeditious, and I think, effectual mode of cultivation. But even in checked corn, I would not entirely dispense with the hoe. There is no implement so effectual in cleansing and cultivating corn when so small that the plough cannot approach sufficiently near without danger of covering or loosening the plant—but one hand-working I deem all sufficient, and that, merely to remove any little grass which may have sprung up near the corn, or to loosen the ground in case it should have become encrusted when the corn is young. But in step, or drilled corn, it must be used at least twice, or oftener, to cleanse or loosen the step or space between the hills; for although many adopt the smothering system, by throwing the earth with the plough in upon the step, and thus covering the grass, I am decidedly of opinion, it is best to remove it. Having every thing in readiness, my plaster and unleached ashes mixed, (which I do on my barn floor, by first sifting the ashes to remove all fire-coals, and lumps of other matter,) I take equal proportions of each, and have it well mixed, and put in barrels which I take to the field, and have placed in a row directly through the centre of the cut intended to be planted, so that the two who drop the mixture, drop from the centre to one extremity of the row and return, which gives them time to replenish their bag or apron, and be in readiness for the plough and corn dropper on their return. My force in planting consists of a ploughman, one who drops the corn, two the mixture, and four who cover. The number of hills that will be in each row is ascertained and divided between the four coverers in proportion to their strength. The plough then starts crossing the rows that have been laid off four feet apart. At their intersection the corn dropper drops from four to six grains, and is followed immediately by the dropper of the mixture, who drops about a large table spoon full directly upon the corn, which is instantly covered. So that the whole operation is carried on in the same row. This keeps those who cover separate, and prevents conversation, which invariably leads to neglect of their work—enables you to apportion the labor where your hands are of unequal strength, and at dinner, at night, or in case of a rain coming up hastily, to leave no row unfinished. Having completed the planting, the field remains until it requires replanting. As soon as the corn grows to be three or four inches high, if there has been no heavy rain to bake the land (in which event I first run the double-shovel plough,) I start a two-horse harrow with such of the teeth as would follow immediately in the row being first removed, and a little boy who follows after with a light rake to remove any stones or clods that may be drawn on the corn. The hoes then follow, remove any grass that may be near the corn, loosen such hills as the harrow may have missed, and set up, and draw a little earth around such plants as the harrow may have prostrated or exposed. The corn is then thinned, leaving two stalks in a hill, and receives two shallow ploughings with the double-shovel plough, which brings it to about the 15th or 20th of June. I then give it a deep ploughing, with a single shovel plough, which brings up the sod that had been turned under in the spring thoroughly rotted, which affords sustenance to the corn at the period when it most requires it—and after it has acquired sufficient rise to shade and cover the ground from the exhausting influence of the sun. It then remains until I finish my harvest, which is generally between the 5th and 10th of July, when I again run the double-shovel plough with a view to level and cleanse the land preparatory to seeding rye, which generally takes place about the 10th of September. The following spring the field is sowed in clover and plastered.

I have thus, Mr. Editor, submitted to your disposal, a detailed statement of my system in the cultivation of corn. The farming interest, and not my supposed mortification at not seeing it appear in your valuable work, will, I hope, be your only consideration as to its publication.

J—— P——.

ADDRESS DELIVERED BY JAMES M. GARNETT, ESQ., PRESIDENT, BEFORE THE FREDERICKSBURG AGRICULTURAL SOCIETY, AT ITS ANNUAL MEETING, ON FRIDAY, THE 13th NOVEMBER, 1835.

Gentlemen—Members of the Agricultural Society of Fredericksburg—

As I have never been a systematic man in any thing, and have had 16 or 17 years experience of your kind indulgence for this failing of mine, I will once more presume that you are still willing to take me—as every man takes his wife—"for better, for worse," and shall therefore proceed to address you in my usual desultory way.

First, I will venture to present you with a little of that gratuitous donation which every man is so fond of bestowing; but very few of taking and applying to any useful purpose. I mean—*advice.* I ought perhaps to abstain, since so many millions before me have failed to accomplish any good by it; but the signs of the times, I think, afford the most cheering hopes, that on the present occasion it will not be altogether thrown away. This advice is—to cultivate and encourage, by all the efforts in your power, that appetite for scientific agriculture, which is now so prevalent, as the only sure basis of all good practice, of all real improvement. That both these are "looking up" (as the mercantile men say,) I infer from the increased circulation of agricultural Journals, such, for example, as those two excellent works "The Farmers' Register" and "The Cultivator"—both of which contain much valuable information in regard to all the branches of husbandry. These, by the way, cannot be too strongly recommended: for both are edited by men of unquestionable talent, knowledge, and agricultural skill, whose experience and high standing in their respective States form a sufficient guarantee for the utility of any thing they will sanction with their names. Both these Journals and all their ablest correspondents concur with me in most earnestly recommending to all agriculturists, that they should base agricultural *practice* upon agricultural *science.* Indeed, the recommendation to combine sound science with practice—as the best means of perfecting the latter—may be safely adopted as a universal rule, applicable, not only to husbandry, but to all trades, professions, and callings—nay to all the legitimate pursuits of life with which, what we understand by the term, *practice* has any thing to do. For example, if you wish for power, the certain course is, *to ga n knowledge;* do you desire fame, you *must obtain knowledge first;* would you accumulate great riches, *much knowledge is requisite for the task;* above all, should you seek the greatest comforts, conveniences, and highest enjoyments of life, it is indispensable to acquire *knowledge, sound, useful, scientific knowledge.* In short to gain this inestimable treasure is our great duty in our present state of existence, and according as it is fulfilled or violated will assuredly be our condition both here and hereafter.

This, perhaps, may be "travelling" a little "out of the record," as our brethren of the bar would say; but in extenuation I will urge, that such excursions have often the good effect of attracting attention to useful remarks which, otherwise, would pass unheeded, if anticipated as matters of course. With this excuse for my deviation from the beaten tract, I shall proceed to another subject of quite a different character. This will be to give you the results of various experiments, made by myself, and of some made by others, since our last meeting. I shall state them, rather in the proof of my determination to follow the course which I have so often recommended to all my brother members, of reporting annually their experience, than for any peculiar value which I attach to them. But the whole body of husbandry being made up of a great number of minute facts and particulars, they must be given in detail by a considerable number of individuals, or it would hardly be practicable to collect them at all.

The first two experiments which I will mention have already been stated in the Farmers' Register, but, as all our members do not take that very useful paper, I will state them again.

From one pint of skinless oats, drilled in a square of my garden, nine inches apart one way and two inches the other, as near as I could have it done, I obtained one hundred and sixteen pints; one of my brothers made five pints from fifty-seven grains. The oats in my garden covered a space of 247 square yards, and would have yielded somewhat more, I think, but 3 spots—each 6 or 7 feet square—were lodged and consequently injured. The oats, when ripe, stood at the average height of about 4 feet, and the grain weighed 47 pounds per bushel. The ground between the drills was hand-hoed twice, and the drills hand-wed twice.

From half a gallon of blue-stem wheat—also drilled—I obtained forty-two half gallons, weighing sixty-one pounds per bushel. The half gallon was drilled, late in October 1834, in some land, from which I had taken a crop of Irish potatoes, manured with stable manure in the trenches. These were reversed in digging, so as to bury the vines between. The top of these new ridges, in which the vines were partially decayed, were chopped down, and trenches opened on them about 2 or 3 inches deep. In these, the wheat was thinly drilled, and lightly covered with an iron-tooth garden rake. It was hand-hoed 3 times and hand-wed twice, but was considerably injured both by the frost and the fly. Another injury was done by 5 fruit trees of a medium size which grew among the wheat. The drills were unnecessarily far apart, being 2½ feet, but I gave them this distance, that the wheat might grow exactly over the buried potato vines. Next year, however, if we live, I shall have it in my power to report to you the result of a much fairer experiment, made with this same variety: for I have drilled ⅝ths of an acre, with a hand-drill, made for the purpose, in some well marled land, previously capable of producing fifty or sixty bushels of corn to the acre. The remainder of this wheat I have sown over a fraction less than three acres of land of medium quality, cultivated this year in corn. The process was to cut off and remove the corn, then to plough up the land, and next to sow the wheat, which was put in by cross-harrowing with an iron-tooth harrow. One acre of this piece had the drag-log first passed over it, the same way with the ploughing, previous to the sowing of the grain and harrowing it in. Of this simple contrivance for crushing the clods, which will always be left after the best ploughing, I will take this occasion to say, that it promises to answer the purpose, far better than any roller or heavy harrow that I have ever seen or heard of. I was induced to try it by two very strong recommendations in the Farmers' Register; in the first of which it is said to be the invention of Mr. Thomas B. Gay, of Goochland, in this state. Like all first trials of a new thing, made with too little care, mine proved somewhat troublesome: for, after fixing my drag-log for two horses, I had to make it lighter twice, and even then, as the log was green, it was a heavy draught. The direction is, to take a straight log, of any kind of wood most convenient, 6 or 7 feet long and about 18 or 20 inches in diameter, (22 or 24 would probably be still better,) at both ends, then to split it and hollow out one of the halves, until you get it sufficiently light. After this, fix two strong bars across the log, and mortice them into another piece of the same size, parallel to the log, and nearly of the same length, to which the horses, mules or oxen are attached, as to the cross bar of a roller. The superiority of this very simple and cheap contrivance, (for the merest cobbler can make it,) over any implement yet used for pulverising ploughed land, none can easily conceive who have not seen it tried. It is certainly true that the same team will draw a roller of the same weight with more ease: but even, supposing that the drag-log required an additional horse—say 3 instead of 2—the latter would do the work so much more effectually, as greatly to overbalance the difference. But let any member try it before we meet again, (it may easily be done,) and most confident I am that his report will furnish additional testimony in favor of the drag-log. As a smoother, and preparer of the surface for grass seed, afterwards to be put in by a fine, light harrow, it is incomparably superior to the roller, unless the land be entirely too stiff and hard to admit of being minutely pulverised by any thing.

My experiment with the Guinea grass is still continued. I have now more than an acre of it, all of which we have cut four, and some of it six times, at an average height, I will venture to say, of more than two feet, although I have not measured it this season, each time, as I did last. I ought to add that we have again suffered severely from drought. The only possible objection that I can yet see to this valuable exotic is, the supposed necessity for cultivating it. I say *supposed*, because I am inclined to believe, from my short experience, that if you plant the roots close enough, in the first instance, and work them once or twice, you may well trust it to produce broad-cast afterwards; for it will certainly spread so as entirely to fill up the intervals between the rows, if they be not more than 18 or 20 inches apart. This, I understand, is the practice in the West Indies, where, after the first clearing and a slight culture, the plants are safely trusted to their own natural powers of increase. I have been the more minute on this subject, because the whole of our tide water country is deeply interested in the subject of what are called—"the artificial grasses." No man who lives in it, but must often have had his "bowels of compassion" strongly moved in behalf of such of our skeleton cattle as survive the continued starvation of a winter and spring, spent in masticating with worn out grinders, corn-stalks, containing perhaps, an ounce of nutriment to the long hundred weight—or else in chewing upon, nothing! the cud of hopeless despondency, and all this too, in most cases, after a summer and fall most industriously occupied in foraging, at the rate of twenty miles a day, for the wherewithal, not of that little known article—*grass*, but of *weeds*, to stay the almost ceaseless corrodings of hunger, until the following day of renewed, but illy compensated, toil and suffering again makes a demand upon their muscular strength, as well as their catering talents, fully equal to all they can command. My good friends—one and all—these things ought no longer to exist to our shame; let all of *us* therefore, to whom the facts apply, hasten to wipe off the disgrace *for such it certainly is*, since nothing is wanting to remove it, but *that* which all can command. Shall I be asked what *that is?* The answer is under every man's nose,—within reach of every man's eyes who can see. *Keep no more stock of any kind than you can profitably feed, and always take care to provide the necessary food for them.* In this simple precept consists the whole secret, (if there be any,) in regard to the propriety of keeping any stock whatever, since the sole object being *profit*, 'tis manifest that none ought to be kept that will not conduce to its attainment! 'Tis also palpably clear that all which are kept in the condition of "praise God bare bones" must inevitably conduce to its failure. How many of us may have been, or may now be, guilty of this violation of good husbandry, it is not for me to say; but acknowledging myself to have been one of the offenders, I may perhaps be excused for the attempt to draw others in with me, by way of securing company in my misdemeanors. We are all gregarious animals, and this strong propensity to involve others as participators of our own guilt in *every* thing wherein numbers are concerned, is an irrefutable proof of it. This must be my excuse in the present case, should any of my hearers believe, that the neglect of farming stock is a very rare fault.

Another experiment which I have made during this summer and fall,—although on a small scale—is with six varieties of turnips obtained from one of Mr. Prince's Agents: viz. *Dales'* new variety, which the seed venders call *Hybrid*, the Scotch yellow stone turnip, the Norfolk white, the Tankard, the Purple top, and Swan's egg turnip, drilled on the 14th of August in the ground on which the blue-stem wheat had grown. This was the cause of my late sowing, as I waited after the stubble was spaded in, until I thought the process of its decay had somewhat advanced. The ground was marled, at the rate of nearly 300 bushels to the acre; this was pulverised as well as the hand-hoe could do it; then spread and lightly chopped in, so as to remain near the surface. The seeds were sown in shallow trenches, (say an inch and a half deep, and 12 inches apart,) by a hand drill, and the plants thinned out, at the usual height, to stand about 5 inches apart. The tops of the plants are now very flourishing notwithstanding the severe drought which we have suffered for some time; but the roots do not appear like attaining any great size, which is probably owing as much to the late sowing of the seed, as to the drought itself. Although each variety is distinctly marked, I cannot judge from this single trial which should be preferred for the table and which for stock, nor should I perhaps have mentioned the experiment at all, but from its connexion with a fact in favor of marl, that I deem worthy of your attention. But here, I beg leave to digress for a moment, to suggest a caution in regard to *all experiments.* This is—to keep a strict watch over ourselves during the whole process; for we are all too apt to form opinions in the outset for or against the result; and so to contrive matters *unconsciously*, as to make that result confirm our preconceived notions. This fact every man must have noticed in himself who ever undertook the unpleasant task of strict self-examination on any subject whatever; and I advert to it on the present occasion, for the purpose of producing the most rigid scrutiny of my own statement of the facts which I shall now submit.

In preparing the ground for the turnips, a few rows were left without either marl or manure of any kind. A few others were sown on the top of covered trenches which had been three or four inches deep, and filled with a mixture of drawn ashes, well rotted weeds and grass, and a portion of fresh cow dung scraped from the cow-pens. This being covered, was lightly chopped, and the seed drilled immediately over the deposite. In the quality of the spot on which these turnips are growing, there is no difference; but much in their present appearance. Around the trees they have been more *injured*, in proportion, than the wheat, and will make very little. The unmanured are considerably better than these—but much inferior to the rest; while the marled turnips, unaffected by the trees, are decidedly better in height, color, and general appearance than those immediately contiguous, which were manured as I have just described. As I am a new experimenter with marl, and have been in the habit of deducting a large per centage from all the accounts I have seen in its favor, on the score of *hobby-horseism*, (if I may be pardoned for coining such a term,) this testimony of mine in support of its claim to be used liberally, will be duly appreciated. I have always had a mortal dread, since I arrived at the age of manhood, of being either accused or suspected of *riding hobbies*, to which I remember being hugely addicted in my childish days; but this dread may not altogether have saved me; and therefore I deem it prudent on all such occasions, to warn my brother members not to suffer their confidence in my veracity—in which it is no vanity to say, they may entirely confide—to prevent their viewing and considering all my statements with that degree of rigid scrutiny which is absolutely necessary to enable them certainly to determine how far these statements contribute to confirm or disprove the principles or opinions designed to be established or refuted by them. The cardinal virtue of *impartiality* is indispensable, both in experimenters and their judges—for without it, no good whatever can be done to any cause whatever—but particularly to that of agriculture, whose improvement entirely depends upon fairly tried, fairly tested, and fairly judged experiments, frequently made, to determine every doubtful point of any importance.

Among my own experiments, since we last met, that, which seems to me at least, of most value, is one to ascertain the comparative productiveness of several varieties of Indian corn. This grain is certainly our chief crop in all the tide water portion of Virginia; and it is likely to become more and more so, unless some means can be discovered of preventing the constant ravages of the Hessian fly, and other enemies to the wheat crop. The importance therefore of ascertaining which of all the great variety of corn cultivated among us, will produce the most to the acre, is much enhanced by the present and long continued uncertainty of making wheat. The best modes of culture too, are consequently becoming objects of daily increasing interest—at least to those who have made up their minds, in the midst of the prevailing mania for abandoning the graves of our parents, wives, children, brothers, sisters, and friends, to live and die by good old Virginia. In these modes we have certainly made such great improvements, since I could recollect, as to encourage the hope, that we may make still greater—simply by taking care not to suspend or discontinue our efforts to improve, from vainly imagining, (as many do,) that we have already reached the "*ne plus ultra*" of advancement as corn-planters and makers.

I perfectly remember, that some forty or fifty years ago, scarcely any other implements, but the illy constructed plough of that day and the hand hoe were ever used in the culture of corn—that the distances at which it was planted were scarcely ever varied—that cross-ploughing was universal on high land—that the stalks were hilled up like tobacco plants—that unless from twenty-four to thirty-six furrows were run by the plough, between every two rows of corn, the proprietor, or his overseer, or both, were stigmatized as very lazy fellows. By the way, let *us* endeavor so to act, as not to furnish our successors with good cause to apply the epithet to us, who are now endeavoring to instruct them.

If any man in the by-gone days to which I have referred, had ventured to assert, before Col. John Taylor proved the fact, (Col. John Taylor, who has done more for Virginia agriculture than any man who ever lived in it,) that corn could be made equally well, or better by running only eight or ten furrows between every two rows, provided the double, instead of the single plough was used; such asserter would assuredly have been treated with unbounded ridicule. Yet the practice, I believe, is now common; although I am satisfied that a still better may be, if it has not already been adopted by some farmers. I myself had hoped to exhibit to you, on this occasion, some implements for the culture—not only of corn—but of all crops planted in rows, which, unless I am deceived by that partiality for our own contrivances—so common to us all, will prove superior, especially in saving labor, to any I have yet seen. But I have been disappointed in procuring all the necessary castings, and therefore can only show two of them at present, with a drawing of the third.

The first is a jointed, expanding harrow, so contrived as to cut any distance from three to five feet, and designed in the first place to open the lists for planting corn, at the same time that it harrows each side of the bed on which the lists are formed; secondly, to work the beds between the rows, which it does by once passing from end to end—the coupling bolts enabling the ploughman to raise or depress the sides so as to work either a convex or concave surface equally well. It is intended for two horses.

The second is a single horse cultivator, with cast iron hoes of a new construction, which, unless I am much deceived, will be found superior to any now in use. Of these small hoes there are four, so fixed in a diagonal bar as to cut about twenty-one inches, and each to throw the earth moved by itself into the furrow opened by the one before it. Another advantage in it is, that it will throw the earth either to or from the corn, cotton, or tobacco, &c. which it may be used to cultivate.

The drawing represents a jointed cultivator for two horses, with seven such irons as those above described, with six harrow-teeth so fixed as to run in the intervals between the cultivator irons. The whole will cut four feet, some few inches. For these irons and the expanding harrow, I shall probably apply for a patent—not, I assure you, to enable me to sell them at an extravagant price, but merely to secure to myself the making of them at the usual fair profits made on agricultural implements, by fair dealers in such articles.

But let me not omit to give you the result of my corn experiment, to ascertain the most productive variety.

Having planted nearly my whole crop with selected seed from the Maryland twin-corn, and so arranged it as to guard it in the best practicable manner, against mixture, I resorted to the following method of comparing it, as to productiveness, with two other kinds, each of which has a high character. The produce in the number of ears and quantity, from thirty stalks of each kind, as they stood in a row, on land judged to be equal in every respect, was as follows:

Maryland twin-corn, 59 perfect years and 19 do. of short corn, - - $4\frac{1}{2}$ gallons.
Richardson's, or Spottsylvania corn,
27 do. do. and 10 do. do., $3\frac{1}{2}$ do.
Peg-corn, 33 do. do. and 4 do. do. $3\frac{1}{2}$ do.

The weight of each kind, after drying for some time, in our common sitting-room, as ascertained by the pocket chondrometer, the little brass cup, of which was well and equally shaken in each case, turned out to be—

Twin-corn,	60 lbs. per bushel.	
Richardson, do.	61 do.	do.
Peg-corn,	58 do.	do.

Now although some, perhaps, may question the accuracy of this little implement, for determining the *actual weight*, per bushel, of any thing; yet, none who know what it is, can possibly doubt its being a perfect standard for testing *relative weight*—which is all that I mean to vouch for, in the above statement.

Another test to which I have subjected two of the above mentioned varieties of corn, has been to ascertain how much grain the same measure of each in the ears, equally heaped and shaken would produce. The result was, that two flour barrels full of years of the twin-corn yielded of shelled grain, four bushels, which was five gallons more than the barrel held; and of course, more than one measure of shelled grain for two in the ears. The other variety, (Richardson's corn,) overrun only two gallons. It is proper here to remark, that I made a second trial between the twin, and the Spottsylvania, or Richardson's, and the peg corn, by gathering and measuring the produce of thirty stalks of each kind, where the distances were alike in all—that is, five and five and a half each way—two stalks in a hill. The result was—

From 30 stalks of the twin-corn, 57 perfect ears, and 10, short corn; produce, 4 gallons 3 quarts.
Richardson's, 35 perfect ears, 12 short do., 4 gallons.
Peg corn, 33 long ears, 5 short do., 3 gallons, 2 quarts and 1 pint.

The peg corn was gathered and measured, in both instances, on a neighboring farm, by a disinterested person, who selected a spot of ground of the same quality with mine, which he knew perfectly well—and the corn on which he had very frequently seen during the summer and fall. He was apprised, too, of my wish to make the trial as fair as possible; my only desire being to ascertain the productiveness of the two kinds, that I might hereafter cultivate the best, and recommend it to others.

My conclusion from the whole experiment is, that the twin-corn is decidedly superior to the popular varieties with which I have tried it, in every respect before stated, and in two others not yet mentioned, in ripening earlier—for it is the dryest I have seen this season; and in producing much smaller stalks, and, of course, drawing less from the land.

In regard to experiments made by others—of which I promised to say something—I have heard of two which I deem worth presenting to your notice. Two gentlemen have informed me that the best corn they made this year, was cultivated, after it came up, entirely with harrows, skimmers and cultivators, with the usual hand hoeings. The other experiment, said to be successful, was, to destroy sassafras bushes, by sprinkling the leaves with brine, so as to make cattle brouse on them.

Before closing my remarks on the present occasion, let me entreat you my agricultural brethren, to encourage, more than you heretofore have done, the practice of reporting your annual experience. Be not deterred from this by any fear of ridicule; for you may rest perfectly assured, that those who indulge the disposition to laugh at your labors, will never of themselves be the discoverers of any thing useful, nor reach any higher agricultural honor than that of being dead weights upon the society, which is so unfortunate as to have them for members.

The most important of all feelings, or desires is, to gain *useful knowledge;* the next in utility, and therefore in dignity, is, *the wish to impart it to others.* To what will this lead? Why certainly, to the effort to communicate all of which we believe others to be ignorant. None of us, consequently, ought to be blamed or ridiculed, merely for mistaking the amount of ignorance which exists in the society to which we belong—for that may even exceed our own estimate. The application which I wish you to make of these remarks (if you approve them,) is, that each member should ask himself, before every fall meeting, *"have I any thing that I myself believe to be worth communicating? If I have, it is my duty, as a member, to communicate it, without wasting a moment's consideration in determining, whether others may, or may not deem it worthy of notice."*

Let me beg you to consider *another thing*—your duty; this is, to exert your influence to increase the number of our members—*not of such as are with us one day, and off the next—of such as join for their own paltry views of petty gain*—but of men sincerely devoted to the great interests of Virginia agriculture, and earnestly desirous to promote them by all the legitimate means in their power. Especially, let this influence be exerted to persuade our non-subscribing friends of this town to join us, and abide by us, "through good and evil report;" for nothing is more demonstrable than that *they* have a more direct and immediate interest in promoting our institution, although not generally agriculturists, than we have who are not residents of Fredericksburg. What is that demonstration? Why that every thing which annually, or indeed, at any time, draws a great additional number of persons to this place insures almost to every dealer in the town, a certainty of making a sufficiency of additional sales to pay much more than it would cost him to become a member of our society. Again; if the labors of our society avail any thing towards making *us* of the country better farmers—our ability to pay to the citizens of this place old debts, and to contract new ones, will be incalculably enhanced.

While I am on this subject, of new members, permit me to remark, that nothing has occurred at any of our meetings which has given us more pleasure, than that a lady should have yesterday become a member of our society. Not a few wishes did I hear expressed, that her laudable example should be followed by many of her sex, who, like her, have the sole management of farms—however they may, at first view, be deterred by the novelty of the case. We have only to embrace horticulture (and why should we not?) among the objects of our society, and *then* even the most fastidious of either sex could raise no objection, on the score of *custom*, to ladies becoming members; for nothing is more common than horticultural societies, which so much augment the comforts of life, consisting principally of ladies. Who so proper, too, as they are, to judge of domestic manufactures, which all the agricultural societies of our country profess a desire to promote? In short, it is to *that sex*, as I have ever thought, to which we must all look—whether as single or associated individuals—for our most effectual aid "in every good word and work," and therefore, should not only hail it as a happy omen of success, when any of them, distinguished as this lady is for her good qualities, volunteer to assist us in what we ourselves believe to be a laudable undertaking, but should invite their co-operation. None, I think, but the strainers of gnats and swallowers of camels can object to it.

I have stated that the kind of members which it is most important for us to obtain, must consist of men sincerely devoted to the great interests of Virginia husbandry, and anxiously desirous to promote them by all the legitimate means in their power. Of such men, let me here testify, (and high is my gratification in being able to do so,) that we have always had, from our commencement, 17 years ago, an ample number to keep our society in constant operation, which cannot be said of any similar institution in our state. Most true it is, that we have several times been in a languishing condition; and, on one or two occasions, have almost despaired of keeping the society up; but the patriotic maxim of one of our most gallant and estimable fellow citizens—*"never give up the ship"*—kept us in heart, until *here we are*, with renovated and confident hopes, that "The Agricultural Society of Fredericksburg," will long—very long survive the oldest liver among us. Let us make it like old wine, which is known to improve both in quality and value, with every year that is added to its age. Let us make it, as we certainly may—what is far, very far superior—the means of improving the social and moral condition of all who are connected with it, or within the reach of its influence. This, by contributing to demonstrate what Virginia farmers and planters can accomplish on the good old soil of their forefathers, will do more than any thing else to check that mad spirit of expatriation which is desolating our homes and fire-sides like a raging pestilence.

AGRICULTURAL CONVENTION.

This body met on the day appointed, and in the manner proposed in the last and previous numbers of this journal. Delegations were present from only two agricultural societies, those of Albemarle and Fredericksburg, and from two popular meetings, the one in Albemarle, and the other of James City and York counties. But however desirable were such appointments, as evidences of interest felt for the objects in view, by entire bodies or portions of the community, the plan of the convention as previously proposed, and repeatedly notified to the public, embraced every person belonging to the agricultural interest, whose zeal for the cause should induce his attendance and participation in the proceedings. The juncture was peculiarly favorable for the assemblage being large, and composed of agriculturists from every part of the commonwealth. In addition to the session of the legislature, and the other usual causes which draw persons from all parts of the state at this season, there were members of three other conventions, besides the agricultural, which served to add to the latter, both in numbers and talents, from remote parts of the state. The proceedings of the Agricultural Convention attracted much attention. The last session was numerously attended,and the proceedings were listened to with apparent interest—and though the memorial was not read until at the close of a sitting of three hours, there remained present at the late hour of 10 o'clock from one hundred and fifty to two hundred persons, when the final, and unanimous, vote of adoption was taken. All persons present had been informed that their participation was invited, and that unless dissent was expressed, all present were considered as members of the convention. If the object of the meeting should be in any measure gained, by obtaining legislative enactments in aid of agriculture, it will be a novelty in the policy and usual procedure of Virginia, that will greatly surprise as well as gratify those who have most zealously urged and aided this effort. But however feeble may be the hopes entertained for legislative action, there is better reason now for their being kept alive, than merely the respectable character of the late convention, and its wishes, alone would authorize. This reason is, that it has become apparent to every thinking man, that the agricultural and general interests of Virginia are in the *utmost need* of all the support that her government and her people can give. That *something must be done for relief*, seems to be the opinion entertained by every one—unless our legislature is to present an all-important exception. If this should be the case indeed, the legislative history of Virginia will present a parallel case to the closing scenes of the Greek Empire—when the people, and their rulers, seemingly forgetful that the Turks were thundering at their gates, were divided into implacable opposing factions, and engaged in disputing on metaphysical subtleties, or religious differences, of which nobody could understand the meaning.

The journal of the convention, and the memorial adopted, are given below. The address of the President of the convention, (which was delivered at the request of the general committee in their meeting of the previous day,) we hope to obtain a sketch of for future publication.

PROCEEDINGS OF THE AGRICULTURAL CONVENTION.

At a Convention of delegates from the Agricultural Societies of Albemarle and Fredericksburg, and from public meetings in the counties of Albemarle and James City, and also of a number of other individuals belonging to the agricultural interest of Virginia—held in the Senate Chamber in the City of Richmond, January 11th, 1836—

On motion of Mr. Craven of Albemarle, James Barbour of Orange, was chosen President of the Convention.

On motion of Mr. Richardson of James City, Edmund Ruffin of Petersburg, was chosen Secretary.

On motion of Mr. Cabell of Nelson,

Resolved, That a committee be appointed by the President for the purpose of considering, and recommending such measures as may be deemed most proper for the adoption of the Convention.

Messrs. Cabell, Ruffin, Randolph of Albemarle, Semple of Spottsylvania, Hairston of Henry, Gooch of Henrico, and Craven were named as the Committee—to which, on motion of Mr. Cabell, the President was added, as Chairman.

On motion of Mr. Randolph,

Resolved, That the President may add hereafter to the Committee any other names, so that the whole number shall not exceed thirteen.

To give time for the Committee to act the next day, the Convention then adjourned to the evening of the 13th inst. at 7 o'clock.

Wednesday, Dec. 13th.

The Committee met, according to adjournment, in the Hall of the House of Delegates. Messrs. Garnett of Essex, Richardson of James City, and Fontaine of King William, had been previously added to the Committee.

The President addressed the Convention at length, in explanation and support of the general measures proposed for legislative aid to agriculture, and especially those recommended by the Committee.

Mr. Garnett presented the following Report and Resolution from the Committee, together with a Memorial to the Legislature, praying for aid to the increase and diffusion of agricultural knowledge—which were read, and then severally adopted by the Convention *unanimously*.

The Committee to which was assigned the duty of reporting on such measures as in their opinion it would be proper for the convention to act upon, beg leave to recommend the accompanying memorial to the favorable consideration of the convention, as containing just and general views of our necessities, and the remedies it would be proper to recommend; and should the memorial be approved by the convention, that a committee of four be appointed, to be composed of such members as can perform the service, to take charge of the memorial, with a view to present it to the legislature, and to attend on such committee as it may be referred to, to give the explanations that may be required.

Resolved, That it is recommended by this body, that an Agricultural Convention shall again meet in the city of Richmond on the second Monday in January 1837, to be composed of delegates from the several Agricultural Societies in Virginia, and from any public meetings of members of the agricultural interest, in counties and towns where no such such societies have been organized.

After the adoption of the memorial, Messrs. Randolph of Albemarle, Gooch of Henrico, Ruffin of Petersburg, and Peyton of Richmond, were appointed the Committee to lay the memorial before the Legislature.

The Convention then adjourned *sine die*.

The Memorial of the Delegates from the Agricultural Societies of Albemarle and Fredericksburg, and many other persons interested in agriculture, from various parts of the State, to the Legislature of Virginia,

RESPECTFULLY SHOWETH—

That the present condition of Virginia husbandry in general, and of her agriculture in particular, imperatively requires every effort which the wisdom and patriotism of your honorable body can exert in their behalf; that for want of legislative aid, although blessed with a soil, climate, and other natural advantages far beyond most of our old sister states, *we* decline in a degree as alarming as it is rapid, while *several of them* rise continually in relative prosperity and importance, as members of our federal union; that thousands of our fellow citizens, in utter hopelessness of bettering their condition in their native land, are abandoning the beloved homes of their nativity, for new and strange homes in "the far west;" that this expatriating epidemic is spreading with such fearful rapidity as to threaten the almost entire depopulation of extensive neighborhoods, once the garden spots of Virginia, unless something can speedily be done to arrest its ruinous progress: and that, for *this something*, we who will not yet "despair of the commonwealth," confidently look to *you*, our representatives—to *you*, the legislators of the land, who as certainly have the power, as we hope and trust, the desire also, to do for the vital cause of agriculture, all that we shall ask. Think not, we entreat you, that we are about to petition you for ourselves alone, it is for the best interests of our own dear state, and for the adoption of the only means left, (as we believe,) of rescuing her from that depopulation and political atrophy brought upon her by her own shameful neglect of all those natural advantages with which an ever bounteous providence hath so abundantly blessed her.

The facts which we have stated are too notorious to be denied, too manifest to pass unnoticed, even by the most careless observer. But their causes are not so obvious nor so recent, as to be well understood without an attentive retrospect into by-gone times.

Our ancestors generally, like all persons who live in countries wherein the means of subsistence are easily procured in superabundance, seem never to have looked forward to days of comparative scarcity, but wasted, in profuse and luxurious hospitality, the time, the industry, and the resources which should have been employed, *at least in part*, to secure pecuniary independence for themselves and their posterity. We say not this to censure those whom we have so much cause to venerate and love, but merely as the statement of an important fact, which would be equally true of ourselves, could we be placed in a similar situation. *We*, their children, thoughtlessly trained up in the same habits, unwarned of our inability to indulge them to the same extent, have pursued a similar course. With means continually, inevitably diminishing by the constant subdivision of property, without any proportionate reduction in expenditure, we opened our eyes too late, to the startling fact of rapid decline, both in private wealth and state influence. Our commonwealth, once confessedly the first in the union—our beloved old state, who once gave away a principality for the preservation of that union, has lived to see the day when some, (we will not say which,) who gave *nothing*, together with many of the very receivers of her bounty, are jeering and taunting her with her comparative weakness. We would scorn to urge this by way of complaint, but we do it to rouse our fellow citizens, if possible, to a closer attention hereafter to our own state interests.

What aggravates much the evils of which we complain, is that, although our eyes are now wide open to the evils themselves, too many of us seem still utterly blind to the causes which have produced them. Thus you will find thousands most fatuitously ascribing them to our lands, our slaves, our geographical position; in short, to *any thing*, rather than to the causes just mentioned, and to our own habits of comparative indolence and improvidence. These, so long as they prevail, must continue to render useless every natural advantage that we either do or could possibly possess. We seem entirely unaware, that these deadly poisons of every community can never be cured by mere change of residence, or simply, by substituting the culture of cotton, and the sugar cane, for that of corn, wheat, tobacco, or any other staple of the old states. We either forget, or have never learned, that *without* increased industry and economy, the opportunity alone to make money will never cause its accumulation; but that with these indispensable qualities to the acquirement and preservation of wealth, even very *inferior* advantages of soil and climate will be more available than the richest lands the sun ever shone upon, to secure all the comforts, conveniences, and enjoyments of life, that rational men ought to desire. That we still have two of the indispensable prerequisites to the fruition of every blessing derivable from government, cannot be truly denied; prerequisites without which the wealth of the Indies would be totally insufficient to secure temporal happiness. These are, a public sentiment and moral force, fully adequate, and at all times desirous to maintain the majesty of the laws. We have a civil power too, fully competent to punish, in the most exemplary manner, all who violate the same, or commit outrages of the kind, either against the peace and order of our community, or the rights of its citizens.

In offering these remarks, we mean to make no invidious insinuations against such of our new states and territories as are continually receiving accessions of citizens from Virginia; let these emigrants themselves inform those whom they leave behind, whether they have changed for the better or worse, so far as regards the conservative influence of public sentiment over morals and manners; the exerted power of the laws of the land; and the efficiency of the civil authority in compelling obedience to them.

We most solemnly assure our friends and relatives, who have lately left us, as well as the long settled and native citizens of the "far west,,' that we feel not the slightest inclination to exaggerate, or "set down aught in malice," against the land of their choice. Its prosperity must always be a source of gratification to us, for their sakes, however we may individually suffer by some of the means of its promotion. If we have heard false acounts of their state of society, let them undeceive us; let them give us the truth; and should it prove that we have been misinformed although our opinions are derived from their own public journals, we will cheerfully retract, however we may lament the consequent breaking up of families, and the loss to Virginia of more of her best blood. We mean not to harm others, but merely *to be true to ourselves*. In doing this, we shall always deem it our duty to assert and maintain, until better informed, that life, liberty, and property, (the possessions which government was formed to protect;) are *yet* more secure in most of the *old states*, than in *several of the new*, or in our territories: that the land of our nativity, drooping and care-worn, and depreciated as she is, may still be found all-sufficient for the happiness of her dutiful and affectionate children: that they are under no political nor moral necessity to desert her: and that all true Virginians who will abide by their parent state, in all the vicissitudes of her fortune; who will determine to aid with heart and hand developing *all her resources*, will promote, not only *her* welfare, but their *own*, much more effectually, than by a precarious search after the latter in strange and distant lands.

It is certainly true, that by abandoning our native homes; by tearing asunder all the domestic ties of early youth and mature age, we *may possibly* find, in some of our new states or territories, greater immediate opportunities of *making money*. But most of us must undeniably do this, at greater risk both to health and life: to the first, from a worse climate in general: to the second, from the additional danger of want of power in the civil authorities, as yet, to afford it adequate protection. The newspapers in most of the new states and territories, abound with uncontradicted proofs of this fact. Grant, however, that the opportunities have actually been found, while health and life remain unassailed, they will prove utterly unavailable, unless the emigrants also abandon and tear away those fatal habits of indolence, profusion and improvidence, which, in very many cases, have produced the supposed necessity for emigration. Whether increased facilities to get rich, and the actual acquisition of riches themselves, will also increase our power to conquer those bad habits which have forced many to expatriation, is a matter well worth the most deliberate reflection of all who are about, but have not yet finally resolved, to turn their backs on home, friends and kindred, for the sake of the single object—wealth. The desire itself we admit to be laudable, provided the motive be—to render our posterity free, independent and happy. But the wiser and more certain course to accomplish our purpose, is, in our opinion, to qualify them by thorough education, to choose for themselves the means of its attainment. To give our children money, will prove a blessing or a curse, according as they use it; but give them morals, manners, useful knowledge, industry and economy, and we may rest perfectly well assured that they will never misapply wealth in many of its forms, whether it be acquired by inheritance or purchase. Pardon this digression, and permit us to resume our efforts to develope the causes of our present depression.

The legislatures, in the early days of our commonwealth, seem never to have deemed it any part of their duty to go much beyond matters of mere local legislation and state police. Hence, the pernicious hallucination still to be found among us, that they really have no power to do more; as if to promote the general welfare of Virginia by popular education and internal improvements, were not quite as much a matter of legislative duty as taking care of oysters in the waters of the Chesapeake—prohibiting fish-traps in navigable streams, and preventing hogs from running at large in petty villages and towns. *Popular education*, that indispensable basis, that *life blood* of all republican government, without which it can have no healthful, no permanent existence—and *internal improvement*, the all-essential means of its prosperity and preservation, seem never for a moment, in those days, to have been thought fit subjects of legislative deliberation. A school to which every citizen could not send his own child, a road, or bridge, or canal, that each could not use himself, were looked upon, it seems, as contraband articles in our legislative halls. Even *now*, the attention of our legislators to these great objects of national interest and regard—these all-important elements of state welfare and influence, falls far short of their requirements.

Another most prolific cause of our fallen condition is, that at a later period of our political history, commencing with the presidency of the first Mr. Adams, and extending, we will not say how near, to the present times, our legislative watchmen have been looking more abroad than at home, for subjects to act upon. The selfish and demoralizing conflicts of political parties, their victories and defeats, always achieved or suffered at some sacrifice of true republican principles, by strengthening the ability of the conquering party to abuse power with impunity, together with the making and unmaking of presidents and vice-presidents of the United States, appeared to be deemed much more important matters of state policy and interest, and more effectual means of maintaining our just rank,our relative influence in the union,than the making and unmaking of state laws, or the speedy developement of all our internal resources and natural advantages, to the utmost possible extent. Instead of its always being made a primary question at our annual elections, who, among our candidates, were best qualified to promote these vital objects, inquiries totally irrelevant—inquiries solely into party qualifications, have, for years past, been almost the only ones ever made. This most inconsiderate and fatuitous course has been a source of unceasing exultation to all those wily politicians in our sister states, who, envying our position at the commencement of our federal government, as head of the union, adopted a much more rational system of state legislation, for elevating themselves to our level, and finally, for soaring far above us in regard to all the most effectual means of real political aggrandizement. Our truly ridiculous state pride—ridiculous because content with ancestral achievements, instead of being stimulated thereby to noble deeds of our own, has aided our rivals much in their efforts for supremacy in our union—for this pride, self-satisfied, and consequently disdaining even to examine for a moment, its means of subsistence, has been feeding upon its own inanity whilst they were accumulating in their elementary schools, in their colleges, by their roads, canals and agricultural societies, real and substantial materials for the only species of exultation which true patriots, real, devoted friends of our union should ever permit themselves to feel. Give us, we entreat you, us who rely upon you to save our state from ruin—give us the same just grounds for exultation, and our children yet unborn, will bless you for the deed.

The fatal consequences of our course might easily have been foreseen and avoided, had not our party prejudices and passions been so aggravated and maddened by constant indulgence, as entirely to blind our judgments to the true interests of Virginia. These consequences are now deeply felt in the very vitals of the state. Large bodies of our citizens are daily fleeing from their native homes, as if they dreaded to be starved to death, should they remain in them longer, whilst those who are left behind, are plunged up to the ears, (all of which are stopped, except to their own confederates,) in reckless political strife, about matters over which they can rarely, if ever, have any effective control, instead of constantly and most anxiously directing all their united efforts towards the preservation of our dear old state from abandonment by her citizens and political degradation. We have only to continue our exterminating party quarrels a little longer, and we shall have nothing left to quarrel about, but the inexpiable guilt of having ruined Virginia.

To *you*, our representatives, our "forlorn hope," in this fearful crisis of our affairs, we must look for some remedy, some curative process, if any can be devised, for the evils which are now spreading over the land like an all-destroying pestilence. Listen not, we entreat you, to any who will cry, "*peace, peace, when there is no peace;*" who would fain persuade you that "*all is well!*" that Virginia is fast resuming her former political importance in the union; that her voice is still attentively heard and highly respected in our national councils, and that little more than what has already been done for education and internal improvement is required to bring back those palmy, prosperous days she once enjoyed. Rather be assured, that without *all the aid* which *you* can give her, the diseases both moral and political, under which she is now suffering so intensely, must finally destroy or reduce her to a condition of which every true Virginian must be utterly ashamed.

These are very unpalatable truths, and some possibly may blame us for uttering them, nay, may accuse us of presenting too gloomy a view of our real condition. But we verily believe, that had similar exposures been more frequently made, our legislatures never would have wasted so much of their precious time in vain attempts to regulate the affairs of the nation, when both duty and interest required them to spend by far the greater part of it in regulating our own state concerns, as the only certain means of sustaining our original rank in the union. The exercise of the latter right, none were likely to dispute, however we might differ about the mode; whereas all attempts to exert the former, have invariably resulted in aggravating our internal dissentions, and making "confusion worse confounded." In the mean time, all the best interests of our state were suffered to lie dormant, as matters that could be taken up at any time, and therefore were not taken up at all. These interminable quarrels, instead of purifying our political atmosphere, as party conflicts are said to do, by those visionary politicians who are led away by false analogies, have overspread the country with contagious moral diseases for which there seems to be no cure, nor any escape, since both the doctors and their patients are alike infected with them, and never come into contact without re-infecting each other.

Until very lately, we have almost entirely neglected the great, the vital elements of state prosperity and aggrandizement. We mean *popular education* and *internal improvement*. At the head of the latter stands *agriculture;* for, according as *that* flourishes or declines, so must all the other interests in the community also flourish or decline. Yet if there ever has been one solitary enactment designed specially to promote this first of all arts, we have yet to learn the fact.

It is certainly true, that your petitioners are all agriculturists, and may therefore be suspected of undue partiality for our own class. But we are unconscious of claiming, or even desiring more than our *real* importance, in all calculations of national good, entitles us to claim of all our legislatures who honestly make *that good* the object and test of every legislative proceeding. Always considering commerce and manufactures our natural allies, our political brethren, we have ever been ready to act towards them as such. But we know no better way of manifesting this fraternal regard, than by constantly fostering *our own interest*, as the most essential, nay, the indispensable means of cherishing *theirs*, and elevating them to the highest degree of attainable prosperity. On this deeply interesting subject, we have but one heart, one mind. Our sole and most anxious desire is, to promote, as far as we possibly can, the full developement and proper application of *all* the resources of our beloved state; to consult together, with one accord, for *her* interest, *her* permanent good; and to devote to this vital cause, all the talents, and all the knowledge we possess. Differences of political opinion in regard to federal politics we certainly have among us; for where is the hole or corner of the state into which they have not found their way? But we have unanimously resolved, (strange as it may seem,) that they shall neither disturb our deliberations, nor in any way mingle with our proceedings: Virginia resources and Virginia improvement by their fullest culture and developement, being the exclusive aim of all our present efforts. If ever there was a time, since the establishment of our commonwealth, which, more than any other demanded such efforts, the present, most assuredly, is that time: and much do we hope, confidently will we trust, that our own harmonious co-operation to resuscitate dear old Virginia, will be fully met, on your part, by far more effective exertions.

Had our legislatures, in the incipient stages of our federal union, extended their fostering care, with due solicitude, to the agricultural interests of Virginia, and to the general education of her people, we have no doubt that most of the evils, if not the whole under which she now suffers, might easily have been prevented. But it is not yet too late, we hope, at least to alleviate, if not entirely to remove them, by future legislative effort, made during your present session, and cordially sustained, as we believe it will be, by your constituents. Something, it is true, has been attempted of late years, in behalf of popular education; but we cannot forbear to repeat, that up to the present hour, nothing, nay, less than nothing, (if we may so express ourselves,) has been done for agriculture —the nursing mother of every legitimate trade, profession and calling in the community. Such, however, were the natural advantages of Virginia, that this shameful and ruinous neglect of them was slower than might have been expected, in producing all those disastrous consequences which ought to have been anticipated in time to prevent them. Hence the fact of their coming upon us, as it were, by surprise.

Some six or seven years have now elapsed, since the first unequivocal symptoms appeared of that emigrating pestilence, which has, ever since, been spreading desolation over the land, and emptying our towns, villages, and the country at large, not only of those who might justly be called the warts and cancerous ulcers of the body politic, but of thousands of our best and most valuable citizens. Whether the fear of poverty or the lust of riches contributed most to produce this effect, it is now useless to inquire, since to whichever cause we ascribe it, the consequences have been alike fatal to our state influence in the union—alike fatal in tearing asunder all the natural ties of home, nativity and kindred.

During all this depopulating and portentous period, what, (we beg leave to ask) what have our legislatures done towards the cure or mitigation of this truly alarming state malady, so far as enactments to promote agriculture generally throughout the state could aid in supplying a cure? Why, they have appointed a committee of agriculture!! And what has that committee done? The answer possibly may be found in some of our legislative journals; it is no where to be seen in our laws; for the volume which contains them is silent as the grave in regard to all agricultural interests. This seems the more strange and unaccountable, when we reflect on the undeniable fact, that a very large majority of every legislature, since the establishment of our state government, has consisted of planters and farmers. Incompetent we cannot believe they were, nor are we willing to pronounce them guilty of treachery to their own class. But we must either do this, or suppose they must have thought agriculture not only capable of flourishing without legislative aid of any kind, but, in the exuberance of their generosity, must have deemed her followers (to borrow the comparison of an English statesman,) like sheep, always ready and willing to be sheared, even to the skin, for the exclusive benefit of others. *This* is a kind of quixotic patriotism, to the motives of which we are willing to accord all the praise it may deserve, when tested by the true principles of sound political economy; but we cannot go farther, and must protest against its adoption, as the rule of legislative action for any of *our* immediate representatives. If any sacrifice of agricultural interest be proved to be essential to the general welfare, *let it be made;* not a man of us will say *nay:* all we ask, and *that* we have a right to require, is, that the case be clearly, indisputably made out; that *we* who pay all the taxes, either directly or indirectly; *we* who thus defray all the necessary expenses of the government under which we live, should enjoy at least such a share of its protection, its care and pecuniary aid, as our relative importance to the general good unquestionably entitles us to expect.

Under these circumstances, we will not permit ourselves to doubt, that *you* to whom we look up for all the good which wise and salutary laws can procure for us, will immediately apply every means in your power to remedy the omissions and neglects of your predecessors in regard to the great agricultural interest of Virginia.

If any examples were wanting to prove that legislative aid may rightfully be given to these interests, we could confidently appeal, not only to several of our sister states, whose wise law-givers have been content *to act*, while we have been consuming months and years in fruitless debates about *the right and the mode of acting;* but we could cite the history of every civilized country under the sun. Not one of them, we believe, can be named, which has not established either agricultural professorships, or agricultural schools, with experimental farms attached to them, or state societies, or boards of agriculture, or some public institution of similar character, demonstrating incontestably, that in *all* these countries it is deemed a long settled, wise and highly essential part of nationl policy to legislate for the promotion of husbandry in each of its branches, but especially of agriculture. Even Scotland, that country which it has been the fashion of some narrow minded people to ridicule for its poverty, has distributed in the course of half a century half a million of dollars to the tillers of the soil, in the form of agricultural premiums, thereby augmenting her agricultural products to the amount of several millions of dollars. Within that period, Virginia has distributed not one solitary cent! in any way whatever, for the promotion of *her* agriculture, although until very lately, she has been almost *exclusively* an agricultural state.

What have been the consequences in all the countries referred to, of this parental, legislative care of agricultural interests? Why, that *in every one of them*, without a single exception, however inferior to Virginia in soil and climate, the condition of its husbandry in general, and especially of its agriculture, *has been* and *now is* far, very far superior to ours. From these facts, the incontestable inference is, that legislative aid is absolutely essential in every country, whatever may be its natural advantages, to the most prosperous condition of its agriculture, and that the connexion of this vital art with science, and its necessary dependence thereon, to reach its highest state of improvement, are quite as demonstrable as in the case of any other art whatever. The truth is, that this connexion between science and art—this mutual dependence upon each other, *has existed* since the world began, and *must last* to the end of it, however the pride of ignorance, and the obstinacy of folly may strive to represent the two as separate and distinct in some instances, and in the case of agriculture, as warring against each other. That such preposterous fatuity should still find any abiding place in Virginia, may be justly attributed to the absence of all legislation on the subject; for had there been any, it is scarcely conceivable that it would not have recognized the essentiality of science in agriculture, and thereby have had a most salutary effect in extirpating the contrary most pernicious belief from the agricultural portion of our community.

In our own confederacy we have the highly praiseworthy example of our sister state of New York to prove how greatly agriculture may be advanced by legislative aid; for all who have taken pains to inform themselves concur in ascribing the rapid improvement in every branch of *her husbandry*, to the establishment and operations of her state agricultural society. *Might not we Virginians* hope for at least equal advantages from a similar state institution? That we should derive still greater, we deem almost certain. First, because the interests of commerce and manufactures bear a much less proportion to those of agriculture in Virginia, than they do to the same interests in New York; and secondly, our sister state is daily *gaining* most rapidly, while we are *losing* in population, wealth, and federal influence. Consequently, any measure would tend to retard, or entirely to check this loss, (as legislative aid to agriculture must do,) would be more beneficial in proportion to *us* than to *them*. We suggest this argument, not from envying their flourishing condition—Heaven forbid, since our unalterable attachment to the union, which we anxiously hope may survive all the fearful conflicts of party politics, will always lead us to rejoice in the prosperity of our confederate sisters, however we may lament our own short-sighted policy in failing to profit by their wiser course in matters of state legislation. So long as we continue a united people in honest and zealous efforts to maintain our federal union in all its purity and unrivalled excellence, so long will it be vitally necessary that we should both believe *in* and *act upon* the principle of each state's having a deep and abiding interest in the welfare of every other state. If *one* should happen to prosper more than the *rest*, either from superior natural advantages, or wiser and more beneficent laws, the true patriots and statesmen of the others, instead of fomenting causes of jealously and ill-will, should be continually cheering their fellow-citizens, in the noble race of national improvement, with the animating exhortation of—"go ye and do likewise." State influence in our confederacy may *justly be* the aim of each; but *just means alone* should be pursued to attain it: and these are *just, wise and patriotic state laws; just, wise and patriotic state policy;* but above all, *great talents* and *incorruptible virtue in the representatives of the state, in our national councils.*

Deeply impressed with the truth of the foregoing views, and thoroughly convinced of their tendency to arrest, or at least to alleviate, most of the evils under which all the best interests of our beloved state are *now*, and *long have been suffering*, your memorialists most earnestly and anxiously pray, that you will give them your immediate and most deliberate attention. Our case, we consider one of life or death—a case wherein the patient must inevitably die, unless the family physician acts with skill, promptitude, and decision.

Your memorialists farther beg leave respectfully to solicit your attention to several plans for the benefit and improvement of Virginia agriculture, either of which, in our opinion, would soon cause her poor and desolate fields to assume quite a new aspect. Were one or more of these plans adopted, you would inspire hope where none now exists—you would revive that which is nearly extinct, and would call forth, by the certainty of legislative aid, that enterprise and exertion which alone are wanting to accomplish a great and most salutary change. *This*, if *any thing*, would effectually check the desertion of our fellow-citizens, now so rapidly leaving us forever. Many, without doubt, would still seek distant lands to mend their ruined fortunes; but more, we verily believe, would attempt to ascertain, with greater certainty than they have done, the chances of disappointment, while still a greater number would cordially embark their all with that patriotic band who have pledged themselves never to give up the good old ship Virginia, while there is the most distant hope of rendering her once more sea-worthy, but to sink with her, (*if sink she must*,) rather than suffer her to be wrecked, merely for want of a sufficient number of strong hands and resolute hearts to man her in the hour of distress, and save her, if possible, from utter destruction. Most true it is, that formidable dangers threaten her from various quarters; alarming breakers and whirlpools appear on almost every side, and steer as she may, escape seems hardly practicable. But with so gallant and skilful a crew as she *once* had, in revolutionary times, and as she *might have again*, (for their indomitable spirit still animates many of their descendants,) she may yet resume her place, and hold on her course amidst the bravest and the best, after weathering all the storms she *has had*, or *may have* to encounter.

To some of your honorable body, this may possibly papear to be the pitiful language of political cowor the still more despicable slang of selfish alarmists, who will address you in *any* terms, whatever, that may subserve their own exclusive interests. But confident as we are in *your ability* to discriminate, and *in the unalloyed patriotism of our own views*, we will most cheerfully submit to *your* determination in regard to the prayer of our memorial.

One of the plans which we beg leave to propose, is the establishment of an agricultural professorship in our University, *never to be filled by any but a scientific and practical agriculturist*, with a salary of $1,500, to be paid out of the unappropriated balance of the literary fund; and in connexion with this, an experimental farm of one or two hundred acres, to be purchased with the same fund; upon which farm the pupils of the professor should be required, as a part of their duty, to labor a certain number of hours every day. Such an institution would furnish, in a few years, a body of hardy young men, skilled both in the theory and practice of agriculture. They would be qualified, at once to become proprietary cultivators of farms, or managers of them for others, instead of spending a large portion of their lives in acquiring the little knowledge they usually possess of such matters, when, by *our* plan, they would have ready for use, all that was necessary, the moment it was called for.

Your memorialists further suggest, that should the experimental farm be established, a fine opportunity would be furnished to redeem the pledge given at the creation of the literary fund, which was, that a youth of good moral habits and intellectual promise, but too poor to educate himself, should be selected from each senatorial district by the entire delegation in both branches, and placed at the University, as the adopted children of the commonwealth. These youths, together with the other pupils of the professor, would furnish all the labor necessary to conduct the farm, and yet have ample time to acquire great literary attainments. By this course, such a number of young men would be redeemed from ignorance, and possibly from vice also, at the same time they would be rendered virtuous and intelligent, as greatly to add to the general intelligence, and prove invaluable in disseminating agricultural knowledge. By such a feature in the administration of the University you would at once destroy the chief ground occupied by its enemies, that it is an aristocratic institution; and in relieving it from the prejudices excited against it by this outcry, you would unite both high and low, rich and poor, in its cordial support.

Another plan is, to establish a state agricultural society, or board of agriculture, somewhat similar to that in New York, to consist of one member, a practical agriculturist, from each congressional district; that their duty should be to meet annually on the same day with the legislature; to sit only weeks, and to receive the same pay for the time as the members of the legislature, to which they should always report, before adjournment, on all such matters as they might deem worthy of legislative action.

A third plan, which in our view promises equal, if not superior advantages to either of the foregoing, is to employ a competent person, with a sufficient salary to defray all necessary expenses for two years, whose duty it shall be to make an agricultural survey or critical examination of all the best cultivated parts of the Atlantic states; and to make a written annual report to the legislature of all the most approved methods within each state, of clearing, draining and fertilizing land; of cultivating, harvesting and preserving the staple crops of the same; of improving, rearing and keeping farming stock of every kind; together with a particular description of all the best agricultural machines and implements. This would form a body of husbandry as valuable to us Virginians, as the Husbandry of Arthur Young, and the Rural Economy and Agricultural Surveys of Marshall, made under an appointment of the English board of agriculture, proved to the agriculturists of Great Britain. That *her* agriculture has flourished more, beyond all comparison, since the publication of those works, than it did for double or quadruple the time before, is a fact universally acknowledged by all who are well informed on the subject; and that a similar work would produce similar effects with us, cannot, we think, admit of a doubt. It would soon be in the hands of every farmer and planter who reads with a view to improve in his profession; state pride (so often misdirected and misapplied,) would aid them in using it for good purposes; and it would prove a highly useful manual to young and inexperienced agriculturists, not yet too wise in their own conceits to profit by "*book-farming*," as it is contemptuously styled by many of those who can scarcely read the works which they most foolishly affect to despise.

At present we have no agricultural work similar to those to which we have referred, nor any thing, indeed, comparable with them, although no imaginable reason can be offered why we should not have them. It is true we have several very valuable agricultural papers, among which we take a pride and a pleasure in naming our own Virginia Farmers' Register. But the information these papers contain is necessarily very miscellaneous: often of little or no importance; insulated and diffused at different times over so wide a surface, and mixed up too with so much irrelevant matter, that to form a connected system of husbandry out of the whole, properly arranged under distinct heads, would be a labor that very few men, if any one, could be able and qualified to perform, not to insist upon the fact, that *none* of these periodicals can possibly have yet published all that is known and beneficially practised by the best farmers and planters of the United States. A work of the kind would immediately make every one who read it acquainted with all the improvements in every branch of husbandry throughout the most highly cultivated portions of our country; whereas, for the want of some such publication, some such authentic record of the progress of agricultural science and practice, we find many parts of Virginia, not very distant from each other, almost a century behind other parts in these highly important matters, and still more behind some of the northern and eastern states. All who have travelled through these states within a year or two past, know the foregoing statements to be true to the very letter, however mortifying and degrading the fact may be in the estimation of every true-hearted Virginian.

Is it not, therefore, high time that we should take shame to ourselves in regard to the present condition of Virginia husbandry? If ever it is to be done, "*now* is the accepted time." But to your honorable body we must look—to *you* we must most earnestly appeal to create and apply the necessary stimuli for rousing us from the deadening lethargy which has so long paralyzed all efficient desire for improvement in the *only things* which can save our state from sinking to the very bottom of the federal scale, after occupying for so many years the high standing which she once did. These things, we must again repeat, are *popular education* and *internal improvements* at the head of which stands *agriculture*. They should be simultaneously carried on, because their action is reciprocal and because they are absolutely essential to the general good, as well as to the purity and preservation of all those republican institutions, to establish which, our venerated patriots of the revolution shed so much treasure, so much blood.

All which is respectfully submitted.

JAMES BARBOUR, Pres.

Edmund Ruffin Sec'y.

For the Farmers' Register.

SOME OBSERVATIONS ON THE GOOD EFFECTS OF COVERING THE SOIL.

Wardsfork, Charlotte County.

I hold it as a fact, within the reach of the most inattentive observer of nature, that covering soil increases its power to produce. I showed in a former communication, the good effects of covering against the action of frost: I will now, in the first place, endeavor to show that the covering of soil prevents the bad effects of beating rains. It is unnecessary to prove that the land is run together by beating rains, and that this running together gives an evident check to the growth of the crop. Whether this effect is occasioned by closing the pores of the earth, or by preventing the inhalation of invigorating properties from the air; or by stopping the rise of moisture from below; or by preventing the easy extension of roots—such is the fact. It is equally clear to me, that covering the soil will prevent the above mentioned injury—for it may be seen where litter is thrown over the surface of the ground, the soil underneath is kept in a soft, mellow state, peculiarly prepared for production. Let a vine or weed find its way through this litter, and how rapidly and luxuriantly it grows. Compare these with vines or weeds growing on the adjacent ground! When a hasty rain falls on grass or weeds or litter, the drops of course strike the covering first, and their force is broken, and the water only trickles into the earth. The more gradually the ground is made wet, and the lighter the drops, the less it runs the land together.

Now, since covering prevents running together—and this injures the crop—it must be a good thing to cover the soil against this bad effect of beating rains.

Secondly; covering is also a protection against the pressure of the hoof—and I would add, it is injured more or less, in proportion to the quantity of the litter—more in the spring and summer, than in the fall; land newly turned out more than that which has been resting; poor land more than rich; old land more than newly cleared, as the roots in the latter, prevent the effect. The truth of the first proposition in this paragraph, will not be disputed by any one—and the others are plain inferences from the first.

Thirdly; the moisture that constantly rises from the pores of the earth, which I would call the *earth-sweat*, is retained on its surface, by covering, which prevents evaporation. This may be seen, by putting down a plank upon the ground and letting it remain but a short time. May not this perspiration of the earth contain something that contributes to the growth or health of the plant? I have observed that a very slight cracking over with the hoe, so as merely to open the pores, produced fine effects. At any rate, the retaining of this moisture, by covering, keeps the skin of the earth (if I may use the expression,) supple—and plants, which resemble hair of the human body, grow better. And observe, when the soil is made close by heavy rains, the hoof, or any other cause, it breaks up in clods, and a great part of the soil is in an inactive state—and until they are pulverized, remain dead capital. These clods have often reminded me of the worthless and idle part of the community, whose room would be better than their company, unless they could, by some pulverizing process, be brought to assimilate with the active mass of our population.

J. R.

EXTRACTS FROM THE REPORT OF THE GEOLOGICAL RECONNOISSANCE OF THE STATE OF VIRGINIA, MADE UNDER THE APPOINTMENT OF THE BOARD OF PUBLIC WORKS.

By William B. Rogers, Professor of Natural Philosophy in the University of Virginia.

TERTIARY MARL REGION.

The extensive area embraced in this division of the state, though presenting comparatively little diversity in external aspect, includes strata, which by their fossil contents, unequivocally refer themselves to two distinct geological periods, though they are all without doubt comprised in the general class of tertiary formations. Adopting the names which have been recently applied in Europe to parts of the tertiary series, to which the strata referred to may be regarded as probably equivalent, though without implying any conviction on our part, that such equivalence is in general to be expected in the two continents, we shall indicate by the term *Miocene* the strata which occur in the eastern and greater portion of this region, and from which the ordinary shell marl is procured, while we will apply the name *Eocene* to the deposite of an older date existing beneath and west of the preceding, containing fossils of a different character, and characterized by the prevalence in considerable proportion of the peculiar mineral called *green sand.*

The first of these, or the *Miocene marl district*, comprehends all the area from the seaboard or water boundary of the state on the east, to a line conceived to be drawn through Northbury on the Pamunkey, and Coggin's Point on the James River, in a direction nearly meridianal, but through what precise points, further observations are necessary to determine.

The other or *Eocene marl district* is comprehended between the imaginary line above described and another line passing from the mouth of Acquia creek, through Wales, at the junction of North and South Anna Rivers, and thence through City Point, and further south in a direction not yet precisely ascertained. Much of the district here defined exhibits Miocene as well as Eocene marl, the former being found either in highlands remote from the rivers, or in the superior parts of the river cliffs overlying the latter. The localities above named were selected as points marking the eastern boundary of this region, because at those places the Eocene marl was observed to disappear below the water line by a gentle dip to the east. Its existence extensively beneath the Miocene district may be looked upon as highly probable, though under what circumstances as to depth and inclination of the beds, we have no positive data to determine.

Miocene marl district.

In the most eastern portion of this division of the tertiary, the general level of the surface is but little elevated above tide. The country is a uniform flat, in some places subject to be occasionally overflowed. The rest of the region in question has an elevation above tide, varying from twenty to eighty feet. But few points, however, in the district have a level corresponding to either of these extremes, and by far the larger portion of the surface preserves a height of from forty to fifty feet.

The surface of this more elevated portion, though preserving a general level of remarkable uniformity, is deeply channelled by innumerable ravines. The smaller of these connect themselves with large ones, and these with the wider and deeper excavations forming the beds of the creeks flowing into the neighboring rivers. The system of ravines connected with one river are separated by a narrow central tract from those connected with the next, and in a general view of the district, these systems present the appearance of mere creeks or inlets subordinate to the great rivers by which this region is broken into peninsulas. The number and extent of the large rivers and the navigable streams of this portion of the state, constitute the most inestimable of its natural advantages. The numerous creeks indenting its peninsulas furnish the cheapest and readiest avenues for a commerce which comes home to the abodes even of its rural inhabitants, while its surface scooped into ravines and its river cliffs washed by the tides, disclose the rich materials which are hereafter to bestow the highest rewards upon its enterprise, by spreading fertility and wealth to its remotest boundaries.

The superficial stratum of the region we are describing is an argillaceous and ferruginous sand of a yellow and sometimes of a reddish color, in which are occasionally found at or near the surface, pebbles and small boulders of sandstone, rarely as much as six inches in diameter. The nature of these boulders would indicate that they were most probably derived from the sandstone formation, which ranges along the eastern boundary of the primary ridge. In some places this stratum consists of little else than a white silicious sand; in others, the admixture of ochreous clay is so considerable as to furnish a suitable material for the manufacture of bricks.

Beneath this superficial layer, beds of a very argillaceous clay occasionally occur, sometimes of considerable depth and extent, and of a texture to be useful in puddling. Its color is various, being in some places a dark blue or green, in others a bright red, or dingy yellow. Wherever found its upper boundary is remarkably even and horizontal; but where it rests upon beds of fossil shells, its lower limit conforms to all the irregularities of surface which those beds usually present. Its appearance, in some places, is that of a steep, almost perpendicular wall of smooth surface, and divided by very narrow lines running horizontally. These narrow lines, at a distance of from five inches to a foot asunder, are formed by a more ferruginous and silicious clay. At Bellefield on the York river, seven miles from Williamsburg, this deposite may be seen overlying the stratum containing shells, in some places, having a thickness of from twelve to fifteen feet, and then gradually fining out and passing into a light colored and coarser mass. The upper surface is horizontal, and the lines of division above alluded to are perfectly parallel and regular. The lower surface of the clay conforms to that of the shell stratum upon which it rests. In many places these argillaceous beds consist of a yellowish clay, beautifully variegated by streaks of red and blue. In some places there exists a slight impregnation of alum and copperas in these beds of clay. This is particularly the case in some localities on the Rappahannock and the York and Chickahominy rivers. The proportion of these ingredients is however not sufficiently great to entitle these strata to attention in an economical point of view, although it is fully sufficient to impart a very ungrateful flavor, and perhaps some useful medicinal properties to the springs and wells of the neighborhood.

A thin stratum of red ferruginous stone, containing a large portion of oxide of iron, is found in this region running horizontally below, and sometimes in the beds of clay before described, and generally separated by only a few feet from the underlying masses of shells. This stratum, which is very generally present, varies in thickness from an inch to a foot. Its texture is sometimes cellular, sometimes compact and fibrous, like that of certain varieties of hematite. In the more eastern portions of the Miocene district, the peculiar structure of which will be hereafter described, much ore of this description lies loosely scattered on the surface; while in the more elevated parts of the country, its invariable position is such as above described. The character of the ore in many localities is such as to promise great facility in reducing it to the metallic state, together with a large per centage of resulting metal. A specimen obtained from above the marl on the cliff at Mount Pleasant, Surry county, yielded by analysis in the 100 grs.

per oxide of iron,	72.40
alumina,	3.90
silica,	7.71
water,	14.35
	98.36
Loss	1.64
	100.00

With a sufficient supply of ore like this, accompanied with the advantage of a shell limestone sometimes beautifully crystalline, in its immediate vicinity, the manufacture of iron would promise a high degree of productiveness; and it is by no means improbable that in some parts of this region the supply of the ore may be found sufficient to make such an enterprise not only safe but profitable. The subject is at all events worthy of some attention. Indeed it appears not a little surprising that this rich mineral seems hitherto to have escaped observation, or at least to have been regarded as undeserving of an especial notice.

In some places, as for example, in Essex county, chiefly upon the ridge land, beds of a ferruginous sandstone are found of sufficient extent to be used as a building material. This rock is not to be confounded with the sandstones which occur some distance to the west of this, on the borders of the primary region; but it is to be looked upon as in the case of a very similar material, recently made the subject of minute inquiry by my brother in New Jersey, as a remnant or outlying portion of a once somewhat extensive deposite of ferruginous gravel and conglomerate, which by subsequent denuding action has been almost entirely removed.

The matter which in most cases rests immediately upon the shells, is a yellowish brown sand, frequently containing a large proportion of clay. Throughout this mass, and often extending to the distance of five or six feet from the shells, particles of green sand, or the silicate of iron and potash, are more or less abundantly disseminated; and in the immediate vicinity of the shells, these particles are generally condensed into narrow stripes conforming in flexure to the irregularities of the bed beneath. Even where a deep hole exists in the layer of shells, the stripes of green sand are seen still following the depression and rise of the surface, and preserving a uniform distance from it. Sometimes these thin layers are so much indurated as to have almost the appearance of stone. In none of the strata above described have fossils of any description ever been discovered.

The materials with which the shells are intermixed, or in which they are embedded, have various characters. In some cases they consist principally of a nearly white sand; in others the argillaceous matter greatly predominates, and the mass is a somewhat tenacious clay. Frequently much oxide of iron is mingled with the earthy matter, and giving it more or less of a yellow or brown appearance, and this is the aspect which the upper beds containing shells most usually present. Very generally the lowest visible fossiliferous stratum is composed of a green silicious sand, and a bluish clay, which being always very moist, is soft and tenacious, and presents a dark blue or black color. At the base of the cliffs on the James and York rivers, this stratum may be traced continuously for considerable distances, rarely rising more than two or three feet above the level of the water, and presenting an even horizontal outline. In the deep ravines, and low down in the banks of shells, generally, throughout this region, a similar dark bluish green argillaceous sand is observed, enclosing frequently a great number and variety of shells. This constitutes what is usually denominated *blue marl*, which from the soft condition of the shelly matter which it contains, as well as the predominance of clay in its composition, is found peculiarly beneficial when applied to the more arenaceous varieties of the soil. Many highly valuable marls extensively in use are of this description.

The very general existence of the lower stratum, above described, forms an interesting and prominent feature in the geology of the Miocene Tertiary districts, as well of eastern Virginia as of Maryland. Throughout all the upper fossiliferous strata, as well as in the argillaceous beds just mentioned, will be found disseminated, greenish black grains of *silicate of iron and potash*, identical with those already described as existing in the stratum immediately overlying the shells, and having the same form and composition with the granules contained very abundantly in an older formation, both in this country and in Europe. In some beds of the marl or shells, these particles so much abound as to give a very decided color to the whole mass. In specimens from James City and York counties, as much as thirty-five per cent. of the green sand has been found, and occasionally shells are seen filled with this substance almost alone.

The surface of the strata containing shells is usually irregular. Sometimes it rises abruptly, in the form of a hillock, then it is scooped out into depressions of a few feet in depth. These irregularities, however, are apparently of two kinds; the one the original form of the deposite, the other produced by denuding action upon the surface. Thus in many places the same stratum may be remarked, rising with more or less abruptness, then again descending, and perhaps preserving a nearly horizontal line for some distance, marked at its upper surface by a clear and unbroken outline, and presenting no indication of violent abrasion from above. In other places, and this is a very frequent occurrence, deep and irregular furrows and cavities are seen, such as would naturally arise from the action of the currents and eddies of a large mass of water in rapid movement. Whether from this cause, or from the gradual dissolving action of percolating water, *sinks* exist in this region in many places, though they are by no means as numerous or extensive as in the limestone districts.

Having thus given an account of the nature and arrangement of the strata overlying the shells, as well as those in which they are embedded, we will now describe the general condition and disposition in which the shells occur.

Condition of the shells in the Tertiary Deposites.

In general the state of the shells, and their arrangement in the earth, are such as to indicate their tranquil deposition at the spots in which they are found. Thus the corresponding valves, are very often found together and closely shut. Many of the smaller shells, such as Arca cenetnaria, Arca incile, Nuculæ, Venericardia alticosta, and Chama congregata, which are most usually found thus, are often either entirely empty, or contain a small quantity of clay that is quite impalpable, indicating plainly that they have been exposed to no violence, and that only such solid matter as could pass between the edges of the closed valves had obtained access to the interior. Whenever such shells, however, have been previously drilled, as is very frequently the case, even with the largest and thickest shells, the interior is found entirely filled with sand, clay, green sand, and small fragments of shell. In most cases the larger species of shells, even when their valves appear to be in accurate juxtaposition, is thus filled, and in this case it cannot be supposed that the contained matter has entered through the holes thus drilled, since in many instances shells of considerable magnitude are found imprisoned within. Such shells, no doubt, after the death of the animal, remained open, or at least partially so, and received the sand, clay and other materials which they contain, by the gentle action of the waves. The ligament at the hinge in the mean time would decay, until at length, yielding to the pressure of the accumulating matter above the shell, in favorable circumstances, would collapse into its natural closed condition.

The very common occurrence of the valves in juxtaposition, is a striking proof, that during or subsequent to their deposition, they have not been exposed to violent agencies. This becomes even more remarkable in the case of such shells as the Panopea reflexa, which almost in every instance is found with the valves properly united. The connection between the two valves in this shell is the slightest imaginable, after the destruction of the natural organic bond, and an inconsiderable force would have sufficed to separate and break the valves.

The admirable preservation of the shells in many cases is also an interesting fact, and affords another evidence of the absence of all violent agencies at this period. The most fragile species of Natica, delicate Telline, Mactra Tellinoides, the shell and processes of the Crepidula, the minute and sharp angles of the Fusus Tetricus, the thin and hollow Fissurella are found in perfect preservation in many places. The state of the shells seems to depend chiefly upon the mechanical texture and chemical character of the materials with which they are mixed, and of which the overlying stratum is composed. In the moist blue clay, the shells are generally found in a very soft condition. In a highly ferruginous clayey bed they are found either partially or entirely dissolved, and beautiful casts remain in their stead.

In many places entire banks occur, composed of *casts* of Chama and other shells, sometimes separate, sometimes cemented together so as to form a species of rock. These appearances occur chiefly near the surface, and when the soil is porous and ferruginous. The casts thus formed, often consist chiefly of carbonate of lime, and in many specimens as much as *eighty per cent.* of this substance is found. Casts of this kind belong mostly to the smaller shells, and by far the most common are of the Chama congregata. These, as already stated, are often found nearly or quite empty, and we may, therefore, conceive, that as the matter of the shell in an extensive bank of Chamas is gradually dissolved, the water charged with carbonate of lime enters the cavities, and slowly deposites the carbonate mixed with fine particles of clay and sand. Thus by degrees the cavities are filled. In the mean time the shell disappears, frequently leaving on the surface of the cast a chalky covering, like the decomposed inner film of shelly matter. In support of this explanation it may be added, that in many casts beautiful crystals of carbonate of lime are found, forming a portion of the cast, and having the appearance of Dog-tooth Spar. In some cases the shelly matter appears to have been dissolved, and its place supplied by the crystallized carbonate, encrusting the earth formerly contained within the shell. Sometimes, too, a thin film of oxide of iron surrounds the cast, showing very distinctly all the markings of the inner surface of the shell. In many localities, presenting a series of beds differing in composition, the shells will be found perfect in some of them, while in others immediately above or below, only casts remain. Thus at the College mill, about one mile from Williamsburg, the upper fossiliferous layer is a yellow silicious sand, containing perfect shells. Below this is a brown ferruginous clay, filled with the most beautiful casts of Chama, Pectunculus, Turritella, &c. The shelly matter has entirely disappeared, and the casts lie loosely in the cavities produced by the removal of the shells, entirely distinct from each other, and covered by a film of oxide of iron. The layer beneath, consisting of bluish green silicious clay, is full of well preserved Pectens, Pernas, and a variety of other shells.

In general, the various species of shells are found associated in colonies or groups, but as in the case of banks of recent shells, these colonies contain many scattered specimens, differing from the general contents of the group. The two species of Chama, the C. congregata and C. corticosa, which are found in almost every deposite of shells in this region, in many cases form extensive beds, with a very small admixture of other genera. The best agricultural marl, of a purely calcareous nature, which is used in lower Virginia, is derived from these beds of Chama, the friable texture of the shell upon exposure to the air, rendering this species of marl more easy of application to land, and more prompt in its ameliorating effects. Crassatellæ often form an extensive deposite, and the large Pectens occur in continuous layers of considerable depth and extent. The different species of Arca, Artemis Crepidula, &c. present a similar arrangement. Even those shells which are of comparatively rare occurrence, are usually found in little groups. Thus the Isocardia fraterna is found, to the extent of a dozen or twenty, closely packed together. This gregarious assemblage of shells of the same species is what would naturally be anticipated in the absence of violent agencies during or after their deposition, and furnishes another very striking proof of the comparatively tranquil condition of the sea or estuary in which they were allowed to accumulate.

Disposition of the fossils.

In nearly all the vertical sections of the deposite we are now describing, a series of beds or strata may be observed, each distinguished by the predominance of one or more species, and the order of superposition of these beds frequently continues without interruption for some distance. It does not appear, however, that in localities remote from each other, the arrangement of the shells is always alike, although in many instances there appears to be a striking correspondence. In a majority of cases in the neighborhood of Williamsburg, the upper layer is composed principally of Chama congregata. In many localities also, the large Pectens mingled with Ostrea Virginica occupy the highest place. But generally, the same shell reappears as a predominant constituent of one or more of the subjacent beds; and such is the diversity of arrangement, even in the places but a few miles distant, that it is obvious that no general order of the succession exists. Thus, in a range of three miles we find Perna maxillata in some localities in the lowest stratum of dark blue argillaceous sand; in others, forming an upper, or even the highest layer of the series. At Waller's mill, three miles from Williamsburg, this fossil overlies the other shells; whereas at the College mill, as already stated, it forms a part of the lowest visible stratum.

With the view of conveying more precise ideas of the disposition of the fossils in this region, we annex the following details in relation to some of the more important localities, which have been minutely examined.

King's mill, one of the most interesting fossil localities in the neighborhood of Williamsburg, is situated on the north bank of James river, about twenty-five miles from its mouth. The cliff in which the shells appear is abrupt, and has a height varying from twenty to forty-five feet above the water. The strata of shells extend along the river with slight interruptions, when the cliff sinks nearly to the level of the water, for a distance of between two and three miles, and they are found in a somewhat similar order of superposition for some distance inland. Their general direction is horizontal, but the outline of any one stratum is frequently very irregular, the surface rising and falling with a steep inclination. This irregular outline is particularly remarkable with the beds of Chama, which are very thick at some points, and then fine out rapidly and again expand.

This deposite of shell is covered to the depth of from four to six feet by a brownish yellow sand, intermixed with stripes of clay. Beneath this a thin layer of about one foot, of very argillaceous and ferruginous clay of a red color. This rests upon a few inches thickness of gravel, consisting of water-worn quartz, rarely larger than a pea. Beneath this is a layer, from one to two feet thick, consisting of yellow sand, containing a great deal of the green or chloritic sand, arranged in narrow stripes. Next follows a layer of the same sand, containing principally Chama and Venus deformis. This is from two or three feet in thickness. Immediately below is a stratum consisting almost exclusively of Chama, with a few Arca centenaria, &c. This stratum, varying from three to four feet in thickness, is a mass of compacted shells, with but little earthy matter intervening. The earthy matter contains a very large proportion of the chloritic sand. The next stratum is composed chiefly of large Pectens, and has a thickness of from one to two feet. Below this is another dense stratum of Chama, together with Arca centenaria, Panopea reflexa, &c. and also very rich in the green sand. Thickness, from four to six feet. Then follows a second layer containing Pectens with Ostrea compressirostra, one foot in thickness. A third stratum in which Chama predominates, follows next, in thickness from two or three feet, and at the base of the cliff is a layer containing Pectens, Ostrea compressirostra, &c. from four to five feet in thickness.

Thus through a height of more than twenty feet in some places, the cliff consists principally of shells, of which there are a great many species besides those mentioned as predominating in the several beds. On the extensive contiguous estates of King's mill and Littletown, these shells are largely used as a manure: and for this purpose the first and seconds beds of Chama are preferred on account of the immense amount of calcareous matter, and the large proportion of green sand which they contain. Judging from the occasional appearance of bluish green clay on the line of the beach, and in some places immediately at the base of the cliff just described, it is highly probable that a continuous stratum of this substance lies beneath the other beds throughout the whole extent observed. A horizontal bed of yellowish clay extends for some distance along a lower portion of the cliff, in which there are no fossils; running within a few feet of its upper edge, and beneath this bed, and parallel to it, is a thin layer of the iron ore formerly described. At the foot of this cliff appears the underlying stratum of clay.

Description of the cliffs at Yorktown on York River.

The elevation, abrupt form, and peculiar structure of the cliffs at this point, and for some distance, both above and below, render it an interesting spot to the geologist. A dry and ample beach, uninterrupted by creeks or inlets for several miles, affords a ready access to the banks, while the river's edge, strewed with fossils which have fallen from the cliff, exposes a considerable variety of interesting specimens. Immediately at York, the river is only three eighths of a mile in width, but both above and below it expands to a breadth six or seven times as great.

At Wormley's creek, about two miles below the town, the cliff about to be described begins; but from this point, down to the extremity of the peninsula, the banks are uniformly flat and low. The cliff here consists at bottom of a bluish sandy clay, containing immense numbers of Turritella alticosta, Cytherea sayana, and many small Univalves, over which lies a layer of brownish yellow sand, with very few shells, and those chiefly Nucula limatula, and a few other species. To this succeeds a stratum composed almost entirely of Crepidula costata, so closely packed together, as to leave little space for sand or other earthy matter. The whole is covered to a variable depth by a stratum of coarse sand of various strong tints, and evidently highly ferruginous. The elevation of the cliff increases, and the nature of its contents gradually changes in approaching York. The lower stratum disappears entirely after continuing for something less than half a mile, previous to which, however, its fossil contents are changed; the layer of the Turritellæ being replaced by Crepidula closely packed together. Crepidula stills runs on horizontally above, and the intermediate stratum is now densely filled with Pectens, Venus deformis, Ostrea, and a great variety of small shells frequently connected together, so as to form hard masses of considerable size. Still higher up the river the deposite assumes the character of successive layers composed of comminuted shells, connected together so as to form a porous rock. These fragments are generally so much rubbed and water-worn, as to render it impossible to ascertain the species of shells of which they once were portions. Many small shells, and occasionally large ones, particularly Pectens, are found mingled with the other constituents of the rocks; and in some places thin layers of shells, such as Venus and Crepidula, intervene between the adjacent strata. The height of this fragmentary rock amounts in some places to forty feet. In most places it has a highly ferruginous aspect, though this is not invariably the case. Frequently shells of considerable size, such as Lucina, anodonta, are seen coated with, or entirely changed into crystalline carbonate of lime, firmly cemented in the mass. The texture of the rock is various, at some points admitting of being readily excavated by the pick and spade, so as to form caves which have been occasionally used by the inhabitants; in other places exhibiting a hard and semi-crystalline structure, and having the compactness of some forms of secondary limestone. The lower portion of the cliff, having less cohesion than the rest, has been scooped out by the action of water, so as to give it occasionally an impending attitude.

Above the town, the stratum of fragmentary rock becomes much thinner, being now reduced to about ten or twelve feet. A stratum of yellowish argillaceous clay, abounding in Artemis acetabulum, Mactras, and other large shells, lies immediately beneath the rock; and lower still, appears the stratum of bluish clay, filled with Nucula Limatula, several species of Fusus, and various other fossils.

A narrow layer of *iron ore* extends along the cliff, with occasional interruptions, at a small distance above the fossiliferous strata.

This fragmentary rock continues in a narrow band, with some interruptions, for about a mile and a half above York. Beyond this point it is met with chiefly in detached masses. Extensive beds of shells, similar to those which appear at York, come to view in the vicinity of Bellefield, and line the shore for a distance of about three miles. These beds rest on the usual stratum of sandy clay, and are in some places, as already described, covered by a stratum of the same substance. At a still remoter point, about six miles above York, on Jones's plantation, a porous rocky mass occurs, overlying the stratum of shells in a thin and interrupted layer. Though very similar in appearance to the fragmentary mass before described, and evidently at one time composed of portions of shells, it is almost devoid of any trace of carbonate of lime. It appears to consist of silex, slighty tinged with oxide of iron; approaching in its porous character and harsh gritty texture, to the nature of the burr stone of France. Associated with this, is a more compact rock, containing some carbonate of lime, much silex, and exhibiting very perfect casts and impressions of Pectens, Cardium, &c. Over these strata is the usual layer of ironstone, and the general aspect of the upper beds is somewhat ferruginous.

It is interesting to remark, that with some interruptions, a fragmentary deposite, similar to that observed at York, extends to the low extremity of the peninsula. At Pocosin, a flat swampy country, which is often inundated by the tides, this deposite is uniformly met with by digging a few feet below the surface Pectunculus, Pecten, Ostrea, as well as numerous small shells occur mingled with it, as at York; the fragments, however, are not cemented together, but form a loose friable mass. A rock, consisting of cemented fragments of shells, occurs also at various other points on the eastern portion of the Miocene district; and a fragmentary deposite, like that above described, is found near the extremity of all the peninsulas formed by our great rivers.

A very interesting feature in the structure of the cliff at York remains to be described. Though the general direction of the fossil beds is nearly horizontal, several of the strata of rock are composed of transverse layers parallel to each other, generally dipping towards the north, and making an angle of fifteen or twenty degrees with the horizon. The course of these laminæ sometimes differs in adjoining strata, and in some places the obliquity diminishes gradually until the laminæ become horizontal; thus presenting a remarkable resemblance to the appearances described by Lyell and others, as existing in the Crag of England. The phenomenon here described, viewed in connexion with the fragmentary structure of the rock, and the general distribution of broken shells over the lower extremity of the peninsula, would seem to indicate the former agency in this district of coast currents and an ocean surf. The beds of shelly matter comminuted by these means, and subsequently elevated above the level of the tide, would be gradually cemented into a rocky mass by the crystallization between the particles of such portions of the calcareous matter, as the rain when just fallen was capable of dissolving. The solvent power of rain, being chiefly due to a portion of carbonic acid with which it becomes united in its descent through the air, would be lost, as the liquid percolated through the shelly strata, and thus the calcareous matter which it had seized, would be gradually deposited in the crystalline form.

Besides shells and Zoophytes, the bones of cetaceous animals and the teeth of sharks, are of very frequent occurrence in the fossiliferous beds, but no remains of *fresh water or land animals* have as yet been discovered. The total number of species of shells from these points which have yet been identified, is about ninety-six, to which may now be added several new species recently discovered, and described in a joint paper by Professor H. D. Rogers and myself.

The structure of the interesting portion of the state lying on the eastern side of the Chesapeake, is so far, as hitherto explored, extremely simple; but as yet only the surface strata have been examined, and it is far from being improbable, that at no very considerable depth beyond that reached by the ordinary wells of the country, deposites calculated to prove of much economical value, might be attained. Beneath the superficial sands and sandy clays of the country, a bed of clay of a tenacious character is first reached, frequently impregnated with salt, and communicating to the water obtained from it more or less of a brackish flavor. Beneath this a more arenacious bed occurs, beyond which, as far as I can learn, no digging has been carried. From this more sandy stratum, water of a purer quality is procured. Hitherto no beds of marl or fossil shells have been found any where in this region. Yet there is reason for the opinion, that such deposites would be met with by boring to some depth, and possibly near enough to the surface to prove available in the agriculture of the country.

The water of the Miocene marl district, whether of wells or springs, presents nearly as great variety as the mineral beds from which it issues. In the more eastern parts of the region, it generally contains a notable impregnation of common salt, and in neighborhoods where shell marl abounds, a marked proportion of calcareous matter. The copiousness and transparency of springs of the latter description, as well as the carbonate of lime which they hold dissolved, give them a character nearly allied to that of the *limestone springs* of other regions, while the common salt which they almost invariably contain, and with which they are sometimes strongly imbued, constitutes an important feature of distinction. The beds of ferruginous clay and sand in many cases, impress a a slight chalybeate character upon the water, and occasionally impart to it so large an impregnation of iron as to render it of decidedly medicinal utility.

Owing to the calcareous matter, and occasionally other substances which it holds in solution, nearly all the water of this region possesses the character of hardness. By boiling, this evil is entirely remedied;—the carbonate of lime is precipitated, first rendering the liquid cloudy, and subsequently collecting on the sides and bottom of the vessel in the form of a thin incrustation. In such of the arts as require a water free from this peculiarity, the marl water should be boiled previous to use; or, in lieu of this, though by no means an effectual substitute, it should be exposed for some time to the sun in open reservoirs. The carbonic acid which is the chief solvent of the calcareous matter, being expelled by heat, suffers the latter to separate from the liquid, and thus the cause of the hardness of the water is in a great degree removed. It is obvious from these facts, that the water obtained from strata of gravel, sand or pure clay, will in general be purest and most suitable for employment in the arts. As an example of the kind of impregnation usual in the water of this district, I subjoin the results of an analysis of the contents of a spring in James City county, near Williamsburg. In 400 cubic inches of this water, the aggregate of solid matter was found to be 104.49 grs. consisting of the following substances, viz:

Muriate of soda,	49.84
Muriate of lime,	15.08
Carbonate of lime,	26.73
Sulphate of lime,	6.24
Silica and alumina,	4.00
Sulphate of soda,	0.25
Ammonia, a trace,	
Organic matter,	1.00
Loss,	1.75
	104.49

The large proportion of Muriatic soda shown to be present in the above instance, is an interesting fact particularly when taken in connection with the locality whence the water was procured. For, it cannot be considered probable that this ingredient could be derived from the neighboring river or the bay, as this would imply an extent of filtration in an horizontal and upward direction, which it would be unphilosophical to admit. It is rather, as I conceive, to be looked upon as referrible to the former impregnation of saline matter derived from the waters of the ocean, beneath which nearly all the strata of this region were originally deposited.

Nature and varieties of the Miocene Shell Marl.

In the general description of the district of which we are now treating, a detailed account has been given of the arrangement of the beds of fossils as they occur in nearly all the localities which have been examined, accompanied by an enumeration of the principle shells, an account of the materials in which they are embedded, and with which they are associated in contiguous strata. We are next to consider the materials of these beds in relation to their agricultural importance, and to exhibit the relative value of the marl of different localities as illustrated by chemical examination. A large proportion of the matter of all shells consists of *carbonate of lime*. Hence they are nearly identical in composition with limestone, chalk and marble. To this ingredient, in whatever form it may be applied to the soil, general experience has ascribed a very high degree of fertilizing power, and hence, in the application of all the varieties of calcareous marl, we are guided chiefly by the proportion of the carbonate which they contain, as determined by chemical analysis. It should not, however, be inferred, that the various mixtures of earths and other substances with which the calcareous matter is usually associated, are devoid of useful action when applied to land. The experience of agriculturists is certainly inconsistent with such an opinion, though it has most clearly evinced the powerful efficacy of calcareous manures. The invaluable publications of the editor of the Farmers' Register by directing the attention of farmers to the employment of the shell marl with which nature has supplied them in such rich abundance, have led so extensively to the application of this manure, and have produced so general a conviction of its fertilizing effects as to render it unnecessary in this place to introduce either facts or arguments in its favor. To the valuable practical suggestions of this gentleman, contained in the "Calcareous Manures" and other publications, we are indebted for much of the amelioration which has taken place in the agriculture of eastern Virginia, and I therefore cannot do better, in alluding to this branch of my subject, than to recommend these works to the earnest perusal of all who are interested in advancing the prosperity of that portion of the state.

But although the richness of the marl is mainly dependent on the *proportion* of its calcareous contents, it is also largely influenced by the nature and condition of the shells of which it is composed. It is well known that the recent oyster shell, especially in its unbroken state, is far less immediate and powerful in its action upon land than the friable and pulverulent shells, of which many of the most valuable marl beds are principally made up. Yet in the composition of the recent oyster shell, the amount of calcareous ingredient is nearly as great as in the richest marl beds which we have examined. According to an analysis which I made some years ago, 100 grains of this material were found to contain

Carbonate of lime,	95.18 grs.
Phosphate of lime,	1.88
Silex (probably accidental,)	0.40
Water,	1.62
Insoluble animal matter,	0.45
Loss, &c.	0.45
	100.00

[*Vide Farm. Reg., Vol.* 1. *and Silliman's Jour.*

These remarks being also applicable to some species of fossil shells, it becomes necessary to a judicious selection of the marl, to give some attention to the different nature of the shells contained in the several varieties of marls offered to our choice.

Kinds of shells which are least likely to be useful.

The fossil oyster and scallop shells, (Ostrea Virginica and Pecten,) of which many marl beds are almost exclusively composed, are generally found in a nearly unaltered state. Comparing the composition of these shells, as ascertained by my analysis, with that of the recent shells, the animal which, though small in quantity, seems to act powerfully as a cement for the other materials, was found to have been retained in almost undiminished proportion; and thus these shells are scarcely better fitted for the soil, than recent ones of the same species. It is to the animal matter retained by the fossil scallops that we are to ascribe the dark color which they assume when burnt for lime. Whatever might be the usefulness of this ingredient if mingled with the soil, it here operates to impair the value of the shell as calcareous manure by the insoluble character it imparts to the materials it holds together. Next in tardiness of disintegration, and in consequent inefficiency as a manure, may be enumerated the large clam, (Venus mercenaria,) and an oblong smooth flat shell, (Crassatella.) These, however, have evidently undergone a change, which prepares them for yielding, more readily than the former, to the agencies of the seasons. Most of the other species, though entire when first found, soon fall to pieces and spread their fertilizing fragments through the soil. There is, however, even among them some room for choice—and this leads us to consider the

Kinds of shells which are most suited for the purpose of marling.

The Chama, formerly mentioned as occurring in extensive beds in some portions of the Miocene, and existing in considerable proportion in nearly all the fossil strata, forms the principal component of some of the most productive marls. This is a small two-valved shell of rugged exterior, which readily breaks to pieces in the ground, and is spread evenly over the land with great facility. Another shell, (Surpula) of which there are numerous rich beds in Surry county, possesses these advantages in a still higher degree. From its fragile texture, and irregular tubular structure, it is quickly mingled with the soil in a minutely subdivided state, and as like the Chama, it frequently occupies the marl beds to the exclusion of other fossils, it furnishes a marl of a very superior description. As a general rule, the small shells are most likely to prove efficacious, as well from the fact that, where they occur, the proportion of carbonate of lime and green sand is usually great, as because they are most easily reduced to the condition in which they become available in the land.

Of the Pulverulent white marl.—In many situations the marl presents an appearance not very unlike that of an impure chalk. The mass of the stratum is chiefly made up of a white or yellowish friable material, intermixed with fragments of the harder species of shells. In such cases the shells are rarely found entire, and the condition of the fragments is usually such as to render it difficult to recognize the species of fossil to which they belonged. Many extensive beds of marl of this description have been opened in the counties of Middlesex, New Kent, James City, York and Gloucester, all of them largely abounding in calcareous matter. Even as much as 97 per cent. of this substance was found in a specimen from one of these localities; and it will appear from the table of calcareous marls hereafter to be given, that in general the proportion exceeds 80 in the 100. Occasionally, however, a mixture occurs in which the calcareous matter is blended with a large proportion of white clay and sand, presenting in the mass an aspect so nearly resembling the former, that without chemical analysis it would be difficult to distinguish between them.

Of the blue marl.—In our general description of the arrangement of the fossiliferous strata, mention has been made of the bluish green or clayey marl which occurs low down in the ravines and near the water's edge on the river banks. This is what is usually known amongst farmers as the blue marl. From the soft condition of the shelly matter which it contains, and the predominance of clay in its composition, this has been found peculiarly serviceable when applied to the more arenacious varieties of soil. In the quantity of calcareous matter which it contains, it is usually inferior to the beds of a white or brown color, which in many places rest above it, though it is not to be inferred that in many instances it may not prove equally advantageous to the land. The coloring matter of the clay appears in part to consist of a carbonaceous matter, derived probably from the organic materials originally associated with the shells, and often in part of a minutely divided green sand, either of which ingredients might be expected to aid the calcareous and clayey matter in benefitting the soil.

Of the hard Ferruginous marls.—In some localities the beds consist of shells more or less broken, intermixed with a brown ferruginous sandy clay, and often cemented with these materials into masses which are broken with some difficulty. These, although rich in calcareous matter, must obviously from their mechanical texture, prove less valuable than either of the former. To this class also, may be referred the shell rock, and fragmentary masses approaching to limestone, which occur in various places.

From the large per centage of carbonate of lime which these contain, there can be no doubt that by burning, they might be converted into a highly valuable lime. A specimen from the cliff at York, yielded 87 per cent. of calcareous carbonate, as large a proportion as most of the valley limestone have been found to contain: computing the quantity of caustic lime, corresponding to this, we find that 100 pounds of the shell rock would yield 48.7 pounds of strong lime. It is, therefore, well worthy of consideration, whether the conversion of this material into lime, might not be an object of profitable enterprise. In the neighborhood of York, and other places, where it occurs, rock of sufficient hardness might be obtained in great abundance, and at comparatively little cost; and the cheapness of fuel would render the operation of burning, one of moderate expense. That much of this rock, when exposed to intense heat, would fall to pieces, and thus injure the value of the product for distant use, is undoubtedly true. But there is also much of it found in bends throughout the cliff, which has almost as great solidity and permanency in the fire, as a secondary limestone, and from this, a lime of superior character might unquestionably be produced. Owing to the great abundance of shell marl in these places, and the general resemblance of this material to the constituents of a marl bank, its probable utility in this point of view, appears hitherto to have been overlooked. But regarding it in its true light, as a *tertiary limestone*, we see no reason why it should not become a source of profitable manufacture in its immediate vicinity.

For the Farmers' Register.

EXPERIMENTS ON GATHERING CORN EARLY, AND DRYING IT IN VENTILATED PENS.

[Subject continued from page 52, Vol. I.]

It is an old remark, of which the truth and value are often admitted, but which is seldom acted on, that the fair and correct reports of experiments which have resulted in loss, and the exposure of the mistaken and false opinions which induced such experiments, would be often as valuable, as any communications of successful practices. But still, the *soreness* caused by the disappointment of sanguine expectations, and the shame felt in confessing that we had formerly entertained very erroneous opinions, and, perhaps had pursued some very foolish practice, serve generally to close our lips as to the experiments which produced disappointment and loss. In consequence of such silence being preserved, the same practices may be repeatedly tried by different persons, each ignorant of what others had previously learned, and thus each in his turn encountering the same risks, and sustaining similar losses. These considerations ought to be enough to induce me to make known the disasters and losses which in some years have attended a practice, which in other years has been highly successful and advantageous. And in addition, it is my duty to state that there is much hazard, at least, in adopting a practice, which I have formerly recommended in this journal, as safe (with proper precautions) and profitable.

The statements respecting the experiments of 1833, were written as they will be given below (from memoranda made at the time of the several occurrences,) and were designed for publication in the following winter. A desire to make the proofs of success and profit complete, by another season's trial on a larger scale, induced me to wait for the securing of the next crop. Of that, a daily journal of proceedings was also kept, from which the following statement is now prepared. These results were as disastrous, as the previous ones had been flattering or successful. The marked difference of seasons and of results left the question still doubtful, and made it proper to wait for a farther trial, which was made in the last crop. Readers will judge for themselves whether greater care, and more judgement, than I was able to have exercised, may not enable them to obtain the benefits of this practice, in suitable seasons, without the risk of loss under different circumstances. The details presented will at least show the different causes of both the safety and danger—and may also throw light on the principles of drying and preserving corn, which may be of use in all other modes of securing the harvest.

The reader will notice throughout the statement of the experiments of 1833, that my confidence in the safety of the plan was unbounded—and so it remained until several hundred barrels of the next year's crop had been gathered. The expressions which grew out of that confidence, however mistaken, as well as all other statements, I have left unchanged.

Experiments of 1833.

In No. 1. Vol. I. of the Farmers' Register, three experiments were reported on the gathering of corn at times much earlier than usual. On part of my crops of 1833, (on two farms in Prince George county, Va.) this practice was continued; and though several errors were again committed, the results have been such as to leave no doubt as to the safety and propriety of the plan. These additional facts will now be presented. As the manner of constructing the pens was minutely described before, (page 50, Vol. I.) it will be unnecessary to repeat the general plan here, though some variations will be mentioned.

The corn crop of 1833 in lower Virginia was matured uncommonly early; and was as dry by the 15th of September, as it was in 1832, on similar soils, by the 30th. A long continuance of rainy weather which lasted through nearly all May, and part of June, had prevented the usual and proper tillage, and had endangered the crop by the growth of grass. The latter part of the growing season had been very dry, and no rain had fallen for several weeks before the commencement of the gathering. About the 11th of September it was unusually cold—the 18th, 19th and 20th, unusually hot for the season. On the last two of these days, my thermometer in the shade, and in open air, rose to 92° and 92½°.

Experiment 4.—Began to gather corn, on September 18th. The tops had been cut about 10 days before, and the blade fodder stripped perhaps 15 days earlier. The land on which the corn grew was generally a clay loam—a smaller part, sandy loam—and the average product about 25 bushels of grain to the acre. Only the ears on which the shucks continued green, (and these were but few) were separated, as not ripe enough for the general treatment.

The first pen was filled with ears, and covered in, by the morning of the 21st. It was 9½ feet square, inside measure, 12 feet high, and with only one flue, (intended for 4 inches wide) carried up through the middle. Before the cover or roof of corn-stalks was completed, a slow rain began to fall.

The first planting of this field had been of the large soft corn, and a large proportion of it, of the red kind. The replanting was generally of the small flinty, or rare-ripe corn, to insure greater equality in ripening. But as the crop had not stood well, *setting* of plants was resorted to, and to this cause I attribute the circumstance that a small portion of the corn of the large kind, was still very green—the hearts of the grains milky, and the cobs so green and sappy that water might have been pressed out of them. Of course, these green ears (with the exceptions that will be named) were not permitted to be penned with the large dryer body.

A material objection to this pen was discovered before it was half finished, but too late to avoid it. Old oak fence-rails, which were neither straight nor strong, were used in part to build the pen; and these not being enough, green pine rails were mauled, as the pen was filling, and used for the balance. The rails were not notched so as to lie close, except near the bottom (to guard against the depredations of fowls,) and the ears were kept from falling through the openings, caused by the irregular form of the old rails and the flexibility of the green ones, by being placed perpendicularly and close together along the most open places. To do this, required a man to be closely engaged in placing the ears, while others were pouring in the baskets of corn—and his continued trampling settled the ears much closer than they would otherwise have been. Besides this, the flue (as formerly) had been kept open by two perpendicular rails being placed within the two ends, so as to keep the sides of the flue from being pressed in by the corn, during the filling. But the green rails so yielded to the pressure, as in some places to close the flue in the middle, and to diminish its average width throughout. The remedy for all these evils, would have been to use seasoned rails, as straight and as strong as pine rails are generally.

The corn in this pen was not moved until January 17th. The winter so far had been very wet, and some fear was entertained that the heavy rains had penetrated the roof of corn-stalks. It did not appear however that a drop had gotten through. The most exposed ears of corn, next the openings between the side rails, and sometimes extending partly outside, were somewhat discolored by the long exposure to rain, and every change of weather—but not rotted, nor materially hurt in any way. The ears partially rotted found in the whole pen, perhaps might have amounted to from one to two bushels. These were principally of the red corn, which was observed, at the time of penning, to have much more of rotten than the white. The whole loss in rotten corn was inconsiderable, and even that did not seem to be attributable to the greenness of the corn. Many ears evidently among the greenest in the pen, (and one of these had been selected, and distinguished by a mark when building the pen,) were observed to be perfectly sound. The closeness of the bulk, owing to the causes above stated, it is probable, was prejudicial, and may have caused, or increased this slight amount of loss.

The very green ears (mostly also small.) which had not been put in the general mass, were mostly put together in a partition only 15 inches wide, in another pen. From their small size, they lay very close together, and many of the greenest were found (Oct. 18th) to be damaged. Blue mould was between the grains, which had evidently proceeded from the cob, but which had not (apparently) affected the inside of the grain. The mould was then completely dry, and of course the progress of injury was at an end. The proper way to prevent any loss in the small portion of such very green corn, is to feed it away to hogs as soon as possible. It is in the best state for that use, and then there would not be an ear lost. It may also be cured sound, (though shrivelled from want of maturing,) by being left in the shuck, and laid to dry singly over an open platform, or floor.

Experiment 5.—On another farm two pens were erected on the barn floor, and the filling of both was commenced on Sept. 24th. The land here was a sandy loam, about equal to the other in productiveness. The whole crop, (including the replanted,) was of the common large white corn. In one of the pens, two flues were made, so as to divide the corn into three separate partitions, and in the other (as in the previous cases) only one flue. All these flues were made a foot wide at bottom, and for a few rails in height—and then were drawn in to the usual width of 4 inches. As there was no danger (in a house) of loss from depredations, nor of exposure to the weather, no care was used to keep the side rails close; and of course no cover was wanting. The pens were raised to the joists (about 12 feet.) After having been filled a few feet, the broad ends of the flue (about a foot deep) were cut out with a saw, so as to make room to introduce a hoe when necessary to draw out such ears as fell through the sides, and might otherwise have choaked the flue. By using this means, no care was wanting to place the ears in the pens, to effect which before, had been both troublesome, and hurtful. The trouble of making and filling pens within doors, was found to be altogether much the easiest job, and was equally effectual. There were no green shucks when this gathering was commenced, nor was there any corn excluded from the pen, except such as was already rotten. The short and greenest ears were put into one of the narrow partitions, and soon after fed to the fattening hogs, without any loss, or the appearance of damage commencing. The remainder of the corn in that pen, was used on the farm by the last of November, without finding more than a dozen ears showing any appearance of mouldiness. The other (with only one flue) was emptied, and the corn beaten out for sale, Jan. 14th and 15th, and every ear that was the least damaged, was separated for my inspection. They were only about 25 in number. The corn was then in good order for shipping, and unusually dry for the time of year. These two pens held about 100, or 110 barrels of corn, and the one mentioned in Experiment 4, about 60 or 65.

The whole amount of mouldy and rotten corn in the three large pens would certainly not have been equal to one bushel of grain to 1000 of the sound. Still it is a matter of some importance to know whether even this small loss was caused by the early gathering: for if it causes *any* to rot, the plan is so far objectionable, and may be dangerous. I fully believe that not a single ear will be lost, or injured, by the proper use of this plan, and that the small loss which I sustained, was owing to other circumstances. This is not susceptible of being proved; but I will state the several reasons for the opinion.

It is customary on every farm, when corn is gathered and housed at the usual late time, to assort the crop into three parcels, long, short, and damaged or rotten. The first parcel includes only the best and perfectly sound ears, and is intended for bread for the family, or for sale. Yet I have never seen a crib of long corn emptied in the spring, without finding rotten ears, and more than could be supposed to have escaped the notice of the laborers when filling the house. I infer that many of these ears, as well as of those found rotten in my pens, though appearing fair outside, when gathered, had some early internal defect, and would have rotted in any mode of housing. Rotten ears of large size and perfect form, and securely covered by the shuck, are often gathered from the stalk, without there being any apparent cause for such an effect; and what is well known to take place thus early, may be reasonably supposed to be sometimes produced, or to reach its completion, after gathering the crop.

If gathering when in a green state alone would cause mouldiness or rotting, the greenest of the ears, however kept after gathering, ought to be so affected. But some of the greenest, selected and marked, have been kept perfectly sound—some singly, some at the outer sides of the pens, and one in the interior. But many sound ears have been found (in Experiment 4th,) pressed out of shape by the weight of the mass, and therefore evidently were such as were soft and full of sap when put up. All such are more or less shrivelled—but that was caused by the fodder and tops being removed, (which kills the plant,) and not by the ears being gathered afterwards. I readily agree that great damage is often done to corn by too soon stripping it of its leaves. In many cases, the damage to the whole crop of grain is not short of the whole *net* profit of the crop of fodder. But this evil, great as it is, has nothing to do with the propriety of early gathering the corn.

On September 20th, a very large and well formed ear of corn, was gathered. The shuck was still green, and therefore the ear was excluded from the pen. When shucked, the grains seemed firm, and as much sunk at the ends as they were expected to become. The cob however, was so green, that sap could be pressed from the end of the pith, by a slight pressure with the thumb nail. In that state, the ear, divested of the shuck, weighed 1 lb. 14½ oz. It was placed in a dry and warm room, and when weighed again, about Christmas, had lost 13 oz. Still, the grains were as firm and as compactly set on the ear as ever, and perfectly sound. The principal loss of weight was from the cob; and by its shrinking in size, the grains were kept as close together as at first. This ear was barely below my standard of fitness for the pen, and many no doubt were included (by carelessness,) still greener. The great proportion of water which it lost in drying, and its perfect state afterwards, show that good ventilation only would have been wasting to it, if in the pen. And further—when the grains are found shrivelled, and standing loosely on the cob, it is evident that the fodder was gathered, and the plant killed, when the grain was still greener than this ear had been when the stalk on which it grew was topped.

I shall entertain no more doubts as to the safety of early gathering corn; and the saving of labor in the whole business of harvesting corn and sowing wheat, thereby made, is a very important matter. A still greater saving of labor (and perhaps of manure,) may be derived from this plan, by ploughing in the green corn-stalks, in preparing for wheat, as soon as the ears have been removed. This will save all the collecting and carting of stalks to the farm-yard, and bringing them back again to the land, and will enable us to be ploughing for wheat fifteen or twenty days sooner than it is prudent to begin to sow, or advisable to cut up and shock the corn in the usual manner.

The precautions which will make the practice perfectly safe and advantageous, are these:

1. Replant (and set, if setting should be required,) with an earlier kind of grain than the first and main planting, so as to have the ripening of all the grain as nearly equal as possible.

2. Begin to gather the corn as soon as nearly all the shucks have lost their green color, and put none with green shucks into the pens.

3. Build the pens in a house, in preference, if convenient: if out of doors, use straight and seasoned rails, not too large. In either case, let there be at least six inches between the rail floor of the pen and the earth, (or the plank floor of the house.) the flue four inches throughout, and a clear passage for air on every side of the pen.

4. The small proportion of soft and greenest corn should be kept thin, and in the shuck, and fed away rapidly.

It is the internal moisture (of the cob) only that endangers ears of corn. No other grain can be kept so easily, or may be exposed to the like rough treatment. We know that dry ears of corn (at the usual time of shucking) are not hurt by rain, and may be put up wet in our open log cribs, and left there, without fear, in bulk, to dry. By carelessness, some of my early gathered corn of the last crop, was exposed to the worst of such treatment, and without injury. A large bulk of corn had been shucked, for penning, and was completely drenched by the heavy rain which fell on the 30th of September and 1st of October. As soon as the rain ceased, the corn, without drying at all, was carried into the upper story of the barn, and laid about two feet thick on a platform of fence-rails raised a few inches from the plank floor. The windows were left open for a few days. This parcel was beaten out for sale a few days ago, and was perfectly dry and sound.

January 25th, 1834.

Experiments of 1834.

Before commencing the statements of experiments of the next year, it is proper to mention several circumstances which led to the loss that ensued. The latter part of the growing season had been attended by a long and severe drought, which parched the leaves of the corn and dried the shucks, so as to produce an appearance of greater maturity than the grain really possessed. Hence, much corn, of which the shuck had partly lost its green color, (my previous test of its being fit to gather,) was actually too green. Next, there prevailed through all the early (and of course the most hazardous) time of gathering, a remarkable, and indeed unexampled succession of rains—and of damp and warm weather generally, when not raining. A third disadvantage was, (and which was alone a sufficient cause of failure,) that the business was carried on by my general orders, but not under my immediate superintendence, nor on the farm where I resided. Hence arose much of the gross carelessness and mismanagement displayed afterwards, but which was not so apparent at first.

1834. *September 16th*. Began to gather corn, and to haul it in to the barn door for shucking. Corn the large white kind—the land light, warm, and rich. The cutting up and securing the stalks, and ploughing the land (for wheat) was to follow immediately after—and it was *designed* that the gathering should be carried on no faster, than would give room for these operations, and permit the shucking and penning of the corn to proceed as fast as the labor could be given. Contrary to this, about sixty-five barrels the first day, was pulled off, and all except the few loads hauled in, left lying on the ground. The carting in of this was not finished until the 19th. Cloudy before night.

17th. Raining more than half the day—generally slowly, but sometimes quite fast. The hands being engaged in securing blade fodder (gathered and curing previously,) until the increase of rain stopped that work, no corn was shucked until evening. Part of the heap was thrown into the barn for that purpose, but not until it had been exposed to the rain for several hours. Began the first pen, in the barn—on a floor of fence-rails—the pen nine feet square, inside measure, and divided as formerly into two parts, by a central flue of four inches between the rails which formed it. The separate bulks of corn were nine feet long, and four wide, the construction of the flue taking up about twelve inches width.

18th. Very damp air, and the corn also damp to an alarming degree. Light drizzle, with driving south wind: increase of rain in the evening. The shucking and penning proceeding.

19th. Cloudy, and more rain threatening, for some hours of the morning—but sunshine before noon, and heat oppressive.

20th. A few more loads of corn pulled and hauled in. Three pens partly filled, as high as five or six feet each, making about seventy-five barrels of corn.

21st. Sunday. Cloudy, and frequent showers throughout the day.

22d. The overseer reported that a warm steam from the corn was noticed early in the morning—but as it was not perceptible to me at 9 o'clock, I supposed that it was merely the effect of the drying of the corn, and made evident by the difference of the internal and external temperature of the air. Cloudy.—Gathering corn again, and began a fourth pen—avoiding as yet to fill any more than six feet deep. At night, and until next morning after day-break, a steady rain, of which a large quantity fell. Nearly all the corn gathered the day before, in a heap outside of the barn door (not shucked) and exposed to all the rain.

23d. In the morning, so damp a steam was rising from the pen No. 3, (began the 18th, and filled only six feet,) that the overseer was alarmed, and was induced to open a hole for examination, by taking out ears from the top—and in this manner, as he reported, he penetrated *below* the dampest corn. I saw that some of the ears taken out for this examination, were evidently so green and soft that they ought never to have been put up in that manner—and these were slightly damaged, and generally where the grains were bruised or wounded by rough and careless handling after being shucked. On other ears had been formed a white mould generally—and the worst of these were two ears that had been lying on the top of the bulk, and had not been covered or moved. These several facts seemed to indicate that, it was the extreme dampness of the weather, and not the position of the corn in the pens, that had caused the damage—and that whatever had been the cause of the injury, it had then ceased to operate. This pen was on the second story of the house, on an open floor of fence-rails laid across the joists, and consequently was as well ventilated as possible. Penned no more corn, for the present, and began this morning to lay the parcel which was last shucked, in the garret of the barn, about two and a half feet deep, on an open floor of rails. About twenty barrels more brought in before night.

24th. Rain began in the night to fall lightly—and continued all this day without cessation, and part of the time heavily, and had not quite ceased at 9 o'clock, P. M. The corn brought in the day before, was thrown into the house soon after day break, before much rain had fallen, and shucked and put up in the garret. This was the only portion of all yet gathered, which had not been in a soaking rain, or in repeated showers, either lying on the ground in the field, or at the barn door before being shucked.

25th. Cloudy and damp until near 10 A. M. Carting in corn again. Shucks of course quite wet. Still putting the corn in the garret. The steam from the third pen still continued, as the corn was damp at and near the top, though dryer, and apparently safe, 18 inches below. Some of the ears which were evidently too green, had fine white mould, (like fibres of cotton,) and these, so far as could be found by examination, were only on and near the top, as if the vapor passing from the bulk in drying, had there condensed (by meeting the colder air) and settled. The other older pens were slightly examined into, and seemed to be in good state—and also the fourth, which had been later filled to the height of four feet only, and with corn less wet. Foggy, and generally cloudy, but some sunshine.

26th. Observed that the corn, (as shucked,) had a little white mould between the grains of many ears—as I supposed, from trial, at least of one ear in every ten of those as large and ripe as any. This too was from the last gathered of the day before, not rained on since, and was as much affected, as any, on the surface of the heap. Of course this effect could not have been produced *after* gathering—and must have been caused merely by the damp weather; and it had probably so affected all the standing corn in my field, and in every other. There was so little mouldiness that it was barely perceptible. It would probably have disappeared in a few dry and cold days—but might spread and become generally injurious in damp and confined air, as was in my barn, notwithstanding the circulation from doors and windows throughout every day—and through some upper windows throughout the night also.

27th. Cloudy, and threatening rain, until 8 A. M.—afterwards, sunshine and very warm. The greenest ears (having the shuck quite green,) had been laid thin on a floor of rails. These were shucked this day, and found to be in good order—sound, and the curing so advanced, that the grain was out of danger.

28th. Sunday—raining incessantly for 16 hours. The heap of corn hauled in the day before, and not shucked, exposed to the weather.

29th. Pulled down one of the divisions of the second pen, $5\frac{1}{2}$ feet deep, and containing 13 to 14 barrels of grain. Picked out carefully every damaged, or too green ear. These made not quite two bushels of ears and ends of ears (broken off) partly rotten, and eight bushels of ears which had been too green for penning, and were still damp, or a little touched with mouldiness, rot, or sprouting. Some sprouts were $1\frac{1}{2}$ inches long. The good corn put into another pen. Cool.

30th. Clear and cool. The corn gathered and hauled up this day was the only parcel from the beginning which could be called free from the wet of rain—and except the part shucked and housed on the 26th, all the balance (about 180 barrels of grain) had been in rain either in the field after being gathered, or at the barn door, before being shucked.

Oct. 1st. Cloudy and threatening to rain, and several light scuds of but a few minutes duration. Very warm through the afternoon. About 4 o'clock, P. M. I discovered that the corn in the first four filled pens, was quite wet, as if in a general sweat—and the same of all in the garret, lying $2\frac{1}{2}$ feet thick over an open floor of rails. Supposed all the balance in the house equally in danger, but had no time then to examine further. Began immediately to pull down the first, third, and half of the fourth pen, and the corn (about 80 barrels) was carried out and spread thin on the ground by 8 o'clock. Rain then threatening, or the work would have been continued longer. In feeling the ears, for examination, my hands were soon made quite wet. Was told that the looking glasses and varnished furniture in my dwelling house had been observed to be as wet as I found the corn. At 8 P. M. the thermometer was at 75 degrees. A slight scud of rain only in the night.

2nd. Proceeded in the morning to empty the remaining pens, but soon stopped, as it appeared that the external moisture of the corn had passed off. The threatening of rain (and which came before night,) compelled the exposed corn to be brought in, and again penned, by noon. About four barrels were left out as touched with mould, rot, or as still too soft and sappy. Perhaps not one barrel of this, if separated by grains, would be considered actually rotten, or greatly damaged.

3rd. Still warm. Return to gathering, shucking and penning, under the shed which covered the horse-power of my thrashing machine. Two pens were finished here by the 8th, and of these only, all the corn kept well.

4th. Threatening rain—which fell heavily at night.

5th. Clear and cold weather. 6th and 7th, clear.

8th. Cloudy, and drizzle for some hours.

Here ends my daily record for that year. The other pens in the house were emptied about this time, and the damaged corn separated, and by such means, the further progress of rotting was stopped.

What was the amount of loss I could not ascertain, as the damaged corn was used for feeding the horses and hogs during the whole time. My overseer reported, as his opinion, that the corn either rotted or greatly damaged, did not exceed 15 barrels, out of near 400 penned in all, before my wheat sowing commenced. But I had little reason to trust to his accuracy, and would therefore guess that double that amount or more would be nearer the truth.

It may appear as the height of folly to have continued to gather corn in the intervals of such a succession of rains. But each rain was supposed to be the last of the wet spell—and whatever loss there might have been incurred from bad weather and bad management in the corn, already gathered, none was anticipated in what was to be gathered at a later time. My previous experiments had been so successful, and a single heavy rain on the corn had been found to be so harmless, that I was rendered foolishly confident. But let it be remembered, that even the ordinary mode of harvesting, corn is not always safe—and that of the crop of 1816, and the last (1835,) many experienced farmers committed as great errors, and lost much more corn and labor, than I did by this novel plan, in this strange and unlucky season.

Experiment of 1835.

On the next crop I would only hazard the experiment of one pen. The corn for this was begun to be gathered on September 21st. No fodder or tops had been taken from the corn, which made the grain less dry than it would otherwise have been. The pen was built under the machine shed, and raised on sills a foot from the ground. The first gathered piece of corn (3 acres) filled it about four feet. Over this, was laid a covering of rails (lying close to the corn) to separate it from the next gathering. On the 25th the filling of the pen proceeded, from another piece of land. Here the blade fodder had been pulled, but the tops not cut off. The corn here was dryer than the first. The pen was filled 12 feet high, inside measure. The lower part, five to six feet high, was open to the wind, but the upper part sheltered from its free passage by the surrounding roof of the shed. All seemed safe. We began to use the corn for bread, and horse food, early in November. The top was dry enough and sound—and so was the bottom and first gathering: but the middle, above the tree opening to the air had many mouldy ears.

It should be remembered (as before stated,) that of this year's crop, like that of the cold year 1816, many farmers have had large quantities of corn to mould or rot, both in the shocks, and in cribs, as managed and harvested in the usual manner. This proves that the last season was very unfavorable to the maturing or drying of corn—and that fact should be considered in passing judgement on my last experiment.

In 1816, after some very cold weather late in December, I discovered that my whole crop of corn was beginning to mould—and except for so much as I could place thin on the floors of several houses, I was compelled to spread all on the ground, exposed for some days and nights to whatever weather might chance to come. Fortunately there was no rain, and all the crop by this airing, was saved in good order, except 40 barrels, picked out previously, as more or less injured by mouldiness. The recollection of this loss alone saved me from its repetition in the crop of last year, (1835)—and very many farmers, in both these years, suffered still more than I did in 1816, or by my trial of early gathering in 1834. Yet no farmer will thence infer, and act in accordance, that it is always unsafe and improper to follow the usual mode of shocking corn in October, and of putting it in houses in November. The proper inference is, that no mode of harvesting any kind of crop is safe in all seasons—and that care, and the proper exercise of judgement, are always necessary.

E. R.

Jan. 26, 1836.

From the Richmond Enquirer.

"The Regie of France have declared an adjudication, or contract, for delivery in samples, to be shown in Paris, in Nov. next, for 3,000 hhds. Maryland, 3,000 Kentucky, and about 3,500 to 4,000 Virginia—not confined to fine qualities, but to range middling, good, and fine, in consequence of a declared purpose of discontinuing the growth of tobacco in France. The deliveries to be made through the spring and summer of 1836.

"This proposal of discontinuing the culture of tobacco in France, is an important feature; but its effects will not be materially felt for another year."

For the Farmers' Register.

COMMERCIAL REPORT.

The commercial transactions of the present and preceding month, have been attended with no remarkable variations. The most important articles of foreign and domestic produce have commanded good prices, but none have been borne up unwarrantably by speculation.

Although it is the prevailing opinion that the crop of cotton in the United States will prove fifty to one hundred thousand bales larger than the previous one, yet with the exception of South Carolina and Georgia, the quantity brought to market is much less than at the same period last year. This is ascribed to an opinion entertained by the planters, that they will obtain better prices at a later period in the season; and the moderate supply has doubtless tended to support prices at higher rates than foreign quotations would seem to warrant. In New Orleans, $13\frac{1}{2}$ to 18 cents—average lots 15 cents. In Mobile, $13\frac{1}{2}$ to $16\frac{1}{2}$ cents. In the Atlantic markets, generally 13 to 15 cents, except for very fine quality. The prices in England continued, until last month, when they became steady, at such low rates, compared with those previously current, as to cause heavy losses on shipments from this country. There is no doubt that the consumption of cotton continues to increase—but the production bids fair to overtake it, as they are now nearly on a par.

Prices of tobacco are well sustained in this country, and generally in Europe. Of that which has been brought to market this season, a large portion is frostbitten, and otherwise of inferior quality; but the better sorts do not usually appear until later in the season—$6 to $10, embrace all but the extreme prices. The manufacturers are actively employed in replacing the quantities which were destroyed by the great fire in New York; estimated at about 10,000 kegs and boxes.

Flour has been rather dull for some weeks past, and may be quoted at $6¾ to 7. Although the stock in the United States is estimated to be unusually small, yet as the home demand is the only important one, the expectation of high prices seems to be abandoned. Wheat commands 130 to 135 cents.

Contrary to the impression which prevailed a few months ago, that corn would be very low, it bears a good price—and a fair demand exists on James river (tide water,) at $3.35 per barrel, or 67 cents per bushel. The product was much diminished by damage sustained in the moist and warm weather during the season for curing.

The uncertainty as to the termination of our differences with France, which appear to us on a point of etiquette, is the cause of considerable anxiety, and creates a want of confidence in commercial operations.

The destructive fire which occurred in New York on the 16th of December, consuming between 500 and 600 stores, and property estimated at more than seventeen millions of dollars, would, it was apprehended, have caused a great number of failures among the merchants there, and even elsewhere; but happily no such consequences have followed—although the insurance offices generally, have as yet been unable to pay their losses, and many of them are rendered insolvent—and no relief has as yet been granted by the government. A higher encomium could not be passed on the mercantile community, than the fact that the members of it, should thus have sustained themselves, and each other, under such an unprecedented calamity.

At this season of legislation, efforts are making in many of the states for a great increase of banking capital—the aggregate exceeding probably, one hundred millions of dollars. The charter of the United States Bank will expire in March next; but an impression now prevails that the state of Pennsylvania will grant a new charter. Should its command of capital as a state institution enable it to check excessive issues by minor establishments, and should its power be used as heretofore, to that end, it may prevent a recurrence of the state of things which existed at the time of its creation, and which in fact, was the chief inducement for founding it. A London banker has, it is stated, established an agency in Boston.

It is a subject of congratulation, that our brethren of North Carolina, with whom our commercial ties are so interesting and important, are about to open a channel of communication, by which the intercourse between that state and all those north of it, will be greatly facilitated. The charter for a rail road from Raleigh to Gaston, (Wilkin's Ferry,) on Roanoke, was no sooner granted, than the citizens of Raleigh, acting in a most liberal spirit, in conjunction with those of Petersburg, at once secured the privileges of the charter and the certainty of effecting the work, by an equal subscription from each place, amounting to $300,000, even in anticipation of the opening of the books. This sum is now receiving considerable accession in those two places—about $400,000 having been already subscribed in them: and as a liberal spirit now prevails among the citizens of North Carolina generally, it will doubtless be displayed by extensive subscriptions in the various towns where books are opened.

The intimate connexion of this work with the rail road now in progress from Richmond to Fredericksburg, and others north of it, which will constitute an uninterrupted line north and south, must induce those who are interested in the success of any one work, to give a helping hand to this, from which they are to derive such obvious advantages. The commercial interests of Petersburg and Richmond are deeply involved in its success: and it is presumed the citizens of the latter place, will evince their readiness to promote this important object by a liberal contribution towards it—particularly as it holds out as fair a prospect of ample remuneration for capital invested, as any similar work. Another link south of Raleigh will complete the great chain. Many other works of internal improvement are in progress, or projected, in various parts of the state.

The manufacturing establishments in Virginia, particularly of cotton, are thriving, and the number of them increasing: the quantity of raw material thus consumed at home, has an evident influence on the price, which, during the season, has usually been as high in Petersburg as in New York—for equal quality.

X.

January 28, 1836.

TO READERS AND CORRESPONDENTS.

The communications of our friends come very irregularly, and during the last month, in but small number. Our January No. was unusually rich in original communications, and this contains very few. We hope that correspondents, both new and old, will hasten to prevent a continuance of such a complaint. Some of those who have recently favored us with *communications*, have sent them *post paid*. This is not desired—and we are unwilling that this additional tax should be imposed on those to whose communications we are indebted for the principal value which this journal possesses.

AGENCIES AND COLLECTIONS.

James Anderson is no longer an agent for this publication. Robert Hill of King William, and his assistants N. B. Hill and Edw. N. Dabney, are the only persons authorized to collect subscriptions due to the Farmers' Register.

Subscriptions may be paid at the bookstore of Campbell and Ruffin, Petersburg, or to the Editor by mail, and at his risk, as heretofore, if the payment is certified by the postmaster at whose office it is mailed.

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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

THE CASE STATED, OF THE COMPARATIVE ADVANTAGES AND DISADVANTAGES OF LARGE AND SMALL FARMS.

It has been more than two years since we marked for re-publication the following portion of Arthur Young's interesting Agricultural Travels in France—and our attention has been again called to it, by meeting with the opposite views of Count Chaptal, in his *Chimie appliquée a l'Agriculture*—of which we have recently obtained the second edition (of 1829) from Paris, and also, the English translation published in Boston, of which we will avail ourselves in making extracts. The reasoning of both these writers, though of general application, was especially designed to apply to the condition of France: and that country, before the revolution of 1789, presented numerous cases of the most striking evils, both of too large and too small divisions of landed property—and since then, the greatly increased divisions (caused by the present legal policy of France,) have served to lessen or remove the former class of evils, and to multiply the latter. Young's work was written nearly 40 years before Chaptal's—and during that eventful time, numerous changes have been made in landed properties, the general tendency of all of which have been to multiply distinct farms, by reducing sizes. The later experience enjoyed by Chaptal, ought to give his testimony additional value and importance: but this is left to the judgement of the reader. We aim to present fairly both sides of this long disputed question, and not, at this time, to offer our own views. It is sufficient to say, that to some extent, the advocates of both sides are right, and in other respects, that both are wrong. Each party views, as is usual, only the benefits of his own side, and the evils of his opponent's—and there are enough facts for either, if considered alone, to make out a very plausible case. In Virginia, our legal land policy prevents all possibility of there being much evil from farms being too large, (or at least of their long remaining so,) and while western lands are vacant, no proprietor will submit to bear the evils of cultivating the smallest landed properties. But in avoiding these, our country has encountered a different evil, which possibly is not less than either of the former. This is the frequent (and from existing circumstances, compulsory) changes of boundary lines of farms, so as to divide large farms into small, and then to convert the same small ones, by consolidating several, to large.

From Young's Travels in France.

Objections to small farms.—The small properties of the peasants are found every where [in France,] to a degree we have no idea of in England; they are found in every part of the kingdom, even in those provinces where other tenures prevail; but in Quercy, Languedoc, the whole district of the Pyrenees, Bearn, Gascoign, part of Guienne, Alsace, Flanders, and Loraine, they abound to a greater degree than common. In Flanders, Alsace, on the Garonne, and Bearn, I found many in comfortable circumstances, such as might rather be called small farmers than cottagers, and in Bas Bretagne, many are reputed rich, but in general they are poor and miserable, much arising from the minute division of their little farms among all the children. In Loraine, and the part of Champagne that joins it, they are quite wretched. I have, more than once, seen division carried to such excess, that a single fruit tree, standing in about ten perch of ground, has constituted a farm, and the local situation of a family decided by the possession.

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Hiring at money rent is the general practice in Picardy, Artois, part of Flanders, Normandy (except the Pays de Caux,) Isle of France, and Pays de Beauce; and I found some in Bearn and about Navarens. Such tenures are found also in most parts of France, scattered among those which are different and predominant; but, upon a moderate estimate, they have not yet made their way through more than a sixth or seventh of the kingdom.

Feudal tenures.—These are fiefs granted by the seigneurs of parishes, under a reservation of fines, quitrents, forfeitures, services, &c.; I found them abounding most in Bretagne, Limosin, Berry, La Marche, &c. where they spread through whole provinces; but they are scattered very much in every part of the kingdom. About Verson, Vatan, &c. in Berry they complained so heavily of these burthens, that the mode of levying and enforcing them must constitute much of the evil; they are every where much more burthensome than apparent, from the amount which I attribute to that circumstance. Legal adjudications, they assert, are very severe against the tenant, in favor of the seigneur.

Monopoly.—This is commonly practised in various of the provinces where *metaying* is known; men of some substance hire great tracks of land, at a money rent, and re-let it in small divisions to metayers, who pay half the produce. I heard many complaints of it in La Marche, Berry, Poitou, and Angoumois, and it is met with in other provinces; it appears to flow from the difficulties inherent in the metaying system, but is itself a mischievous practice, well known in Ireland, where these middle men are almost banished.

Metayers.—This is the tenure under which, perhaps, seven-eighths of the lands of France are held; it pervades almost every part of Sologne, Berry, La Marche, Limosin, Anjou, Bourgogne, Bourbonnois, Nevernois, Auvergne, &c. and is found in Bretagne, Maine, Provence, and all the southern counties, &c. In Champagne there are many at *tier franc*, which is the third of the produce, but in general it is half. The landlord commonly finds half the cattle, and half the feed; and the metayer labor, implements, and taxes; but in some districts the landlord bears a share of these. In Berry some are at half, some one-third, some one-fourth produce. In Roussillon the landlord pays half the taxes; and in Guienne, from Auch to

Fleuran, many landlords pay all. Near Aiguillon, on the Garonne, the metayers furnish half the cattle. Near Falaise, in Normandy, I found metayers, where they should least of all be looked for, on the farms which gentlemen keep in their own hands; the consequence there is, that every gentleman's farm must be precisely the worst cultivated of all the neighborhood:—this disgraceful circumstance needs no comment. At Nangis, in the Isle of France, I met with an agreement for the landlord to furnish live stock, implements, harness, and taxes; the metayer found labor and his own capitation tax:—the landlord repaired the house and gates; the metayer the windows:—the landlord provided seed the first year; the metayer the last; in the intervening years they supply half and half. Produce sold for money divided. Butter and cheese used in the metayer's family, to any amount, compounded for at 5s. a cow. In the Bourbonnois the landlord finds all sorts of live stock, yet the metayer sells, changes, and buys at his will; the steward keeping an account of these mutations, for the landlord has half the product of sales, and pays half the purchases. The tenant carts the landlord's half of the corn to the barn of the chateau, and comes again to take the straw; the consequences of this absurd system, are striking; land which in England would let at 10s. pay about 2s. 6d. for both land and live stock.

At the first blush, the great disadvantage of the metaying system is to landlords; but on a nearer examination, the tenants are found in the lowest state of poverty, and some of them in misery. At Vatan, in Berry, I was assured, that the metayers almost every year borrowed their bread of the landlord before the harvest came round, yet hardly worth borrowing, for it was made of rye and barley mixed: I tasted enough of it to pity sincerely the poor people; but no common person there eats wheaten bread: with all this misery among the farmers the landlord's situation may be estimated by the rents he receives. At Salbris, in Sologne, for a sheep-walk that feeds 700 sheep, and 200 English acres of other land, paid the landlord, for his half, about £33 sterling; the whole rent, for land and stock too, did not, therefore amount to 1s. per head on the sheep! In Limosin the metayers are considered as little better than menial servants, removeable at pleasure, and obliged to conform in all things to the will of the landlords; it is commonly computed that half the tenantry are deeply in debt to the proprietor, so that he is often obliged to turn them off with the loss of these debts, in order to save his land from running waste.

In all the modes of occupying land, the great evil is the smallness of farms. There are large ones in Picardy the Isle of France, the Pays de Beauce, Artois, and Normandy: but, in the rest of the kingdom, such are not general. The division of the farms and population is so great, that the misery flowing from it is in many places extreme: the idleness of the people is seen the moment you enter a town on market-day; the swarms of people are incredible. At Landervisiau, in Bretagne, I saw a man who walked seven miles to bring two chickens, which would not sell for 24 sous the couple, as he told me himself. At Avranches men attending each a horse, with a pannier load of sea ooze, not more than four bushels. Near Isenheim, in Alsace, a rich country, women, in the midst of harvest, where their labor is nearly as valuable as that of men, reaping grass by the road side to carry home to their cows.

Observations.

Three material questions obviously arise; 1st, the inconveniencies of metaying, and the advantages of the tenure at a money rent; 2d, the size of farms; 3d, how far small properties are beneficial.

Metayers.—This subject may be easily despatched: for there is not one word to be said in favor of the practice, and a thousand arguments that might be used against it. The hard plea of necessity can alone be urged in its favor; the poverty of the farmers being so great, that the landlord must stock the farm, or it could not be stocked at all: this is a most cruel burthen to a proprietor, who is thus obliged to run much of the hazard of farming in the most dangerous of all methods, that of trusting his property absolutely in the hands of people who are generally ignorant, many careless, and some undoubtedly wicked. Among some gentlemen I personally knew, I was acquainted with one at Bagnere de Luchon, who was obliged to sell his estate, because he was unable to restock it, the sheep having all died of epidemical distempers; proceeding, doubtless, from the execrable methods of the metayers cramming them into stables as hot as stoves, on reeking dunghills; and then, in the common custom of the kingdom, shutting every hole and crack that could let in air. In this most miserable of all the modes of letting land, after running the hazard of such losses, fatal in many instances, the defrauded landlord receives a contemptible rent;—the farmer is in the lowest state of poverty;—the land is miserably cultivated; and the nation suffers as severely as the parties themselves. It is a curious question how this practice came to be exploded in Picardy, Normandy, and the Isle of France. The wealth of great cities will effect something, but not much; for Bourdeaux, Marseilles, and, above all, Lyons and Nantes, have done nothing in this respect; yet they are to be classed among the richest cities in Europe, and far beyond Rouen, Abbeville, Amiens, &c. And were we to ascribe it to the nearer vicinity of the capital, why has not the same cause established a good husbandry, as well as rents paid in money? The fact, however, is certain, that those provinces, with Artois and Flanders, in which we should not be surprised at any variation, as they were conquered from a free country, comparatively speaking, are the only ones in the kingdom where this beneficial practice *generally* prevails. It is found, indeed, in a scattered and irregular manner elsewhere, but not established as in those provinces. That the poverty of the tenantry, which has given rise to this mischievous practice, has arisen from the principles of an arbitrary government, cannot be doubted. Heavy taxes on the farmers, from which the nobility and clergy are exempt; and those taxes levied arbitrarily, at the will of the intendant and his subdelegués, have been sufficient to impoverish the lower classes. One would naturally have supposed, from the gross abuses and cruelty of this method of taxation, that the object in view were as much to keep the people poor, as to make the king rich. As the taille was professedly levied in proportion to every one's substance, it had the mischievous effect of all *equal* land taxes, when levied even with honesty; for a farmer's profit—his success—his merit, was taxed exactly in proportion to the quantum; a sure method of putting a period to the existence of either profit, success, or merit. The farmers are really poor, or apparently poor, since a rich man will affect poverty to escape the arbitrary rise of a tax, which professes to be in proportion to his power of bearing it: hence poor cattle, poor implements, and poor dung-hills, even on the farms of men who could afford the best. What a ruinous and detestable system, and how surely calculated to stop the current of the wealth of the sovereign, as well as of his people! What man of common sense and feeling, can lament the fall of the government that conducted itself on such principles? And who can justly condemn the people for their violence, in wresting from the nobility and clergy those privileges and distinctions, which they had used so unworthily, to the depression and ruin of all the inferior classes? These taxes, united with the burthensome and odious feudal rights and impositions of the seigneurs, prevented all investment of capital, which could not be removed at pleasure, from the land: the evil was not so much a general want of capital in the kingdom, as an apprehension of fixing it on land, where it would of necessity be exposed to the rapine of regal and noble harpies; that this was the fact, we find from the case of the rich grazing districts of Normandy, where no want of capital was heard of, yet such lands demand a larger sum to stock than any other; a sum equal to the amplest improvement of the poorest and most difficult soils. Why then should not a proper stock be found on arable as well as on pasture lands? For an obvious reason; the capital invested in fat oxen and sheep is removeable at a moment's warning; and, being every year renewed, the grazier has an annual opportunity of withdrawing from business; he has consequently a sort of independence, utterly unknown to an arable farmer, who has the least idea of improving his land, or of keeping a proper stock of implements and manure. The knowledge of this circumstance keeps the tyrants in order, and makes them tender in impositions, which being evaded, would leave the most valuable land in the kingdom without the means of being rendered productive. Warmly as one must congratulate human feelings, upon a nation's throwing off the yoke of such detestable burthens, we cannot but regret and condemn the idea of those visionary, systematic, pseudo politicians, the *œconomistes*, which has so infected the National Assembly, as to allow the proposal even to be received, of laying a *proportional* land-tax of thirteen million sterling. This the present democratic principles will certainly *keep proportional*, since it is the wealthy who can alone improve; and the poor, with power in their hands, will always take care to tax the improvements of the rich. If this new system be not guarded with clauses, of which no trace appears at present, the agriculture of the kingdom will no more be able to raise its head, than under the old system. But this is not the place to discuss that important question. In regard to the best means of remedying the evils of metaying, they certainly consist in the proprietor's farming his own lands till improved, and then letting them at a money rent, without the stock, if he can find farmers to hire; but if not, lending the stock at interest. Thus favored, the farmers would, under a good government and eased of tythes, presently grow rich, and, in all probability, would, for the most part, free themselves from the debt in twenty-five or thirty years; and, with good husbandry, even in a single lease of twenty-one years; but with their present wretched systems of cropping, and deficiency of cattle and sheep, they would be a century effecting it. If a landlord could not, or would not, farm himself, the next method would be, to let live stock and land at a money rent, for twenty-one years, the tenant, at the expiration, paying him in money the original value of the live stock, and subject to all hazard and losses. There can be no doubt but such a system, with a good mode of taxation and freedom from tythes, would enable the metayer in that term to become at least capable of carrying on his business, without any assistance in future from his landlord.

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Size of Farms.—I have treated at large of this subject in my tours through England, and in the *Annals of Agriculture*, vol. vii. p. 510; at present, therefore, I shall briefly touch upon some circumstances more peculiarly arising from the husbandry of France. I shall begin by asserting, with confidence, that I never saw a single instance of good husbandry on a small farm, except on soils of the greatest fertility. Flanders is always an exception; on that rich, deep, and putrid soil, in the exuberant plain of Alsace, and in the deep and fertile borders of the Garonne, the land is so good, that it must be perversity alone that can contrive very bad husbandry; but on all inferior soils, that is to say, through nine-tenths of the kingdom, and in some instances even on very rich land, as, for instance, in Normandy, the husbandry is execrable. I may farther observe, that whenever bad management is found in those rich and well cultivated districts, it is sure to be found on small farms. When, therefore, I observed in many *cahiers* of the three orders, a demand to limit the size of farms, and great panegyricks on small ones, I could not but conclude, that the townsmen who drew up those instructions knew nothing of the practice of agriculture, except the vulgar errors which float in every country upon that subject.* This inquiry is of so much importance to every nation, that it ought to depend as much as possible on facts, and of course to be handled by those only who practice agriculture as well as understand it. The following questions naturally arise. Is it the gross produce of husbandry that should chiefly be considered? Or the greatest produce that can be carried to market? Or is it the net profit? Should the populousness arising from cultivation be the guide? Or should the ease and happiness of the cultivators be only had in view? These questions might be multiplied, but they are sufficient for unfolding the inquiry. It will probably be found, that no one point is singly to be attended to, but an aggregate of all, in due proportions.

The gross produce cannot be alone considered, for this simple reason, that so many hands may be employed to raise the largest, as to afford none for market; in which case there could be no towns, no manufactures, but merely domestic ones; no army, no navy, no shipping. Such an arrangement,

* Cahier de Dourdon, p. 17, Crepy, p. 5—Estampes, p. 27.—Paris, p. 41.—Provins and Montereaux, p. 51

though perfectly consistent with the Count de Mirabeau's system, of an equal dispersion of a people over their whole territory, is yet so truly visionary, that it does not demand a moment's attention.

The net profit of husbandry cannot possibly be the guide, because the most uncultivated spots may be attended with a greater net profit on the capital employed, than the richest gardens; as a mere warren, sheep-walk, &c.

Populousness cannot be a safe guide in the inquiry, because if it be alone attended to, it infallibly destroys itself by excess of misery. There can be no merit in any system that breeds people to starve; food and employment (towns) must, therefore, be in view as well as people.

The ease and happiness of cultivators alone cannot be our guide, because they may be easier and happier in the midst of a howling desert, than in the gardens of Montreuil.

I am not absolutely satisfied with the *greatest produce that can be carried to market*, but it comes infinitely nearer to the truth than any of the rest; it includes a considerable gross produce; it implies a great net profit; and indicates, exactly in proportion to its amount, that populousness which is found in towns, and that which ought to depend on manufactures; it secures the ease of the cultivating classes; it enables the farmer to employ much labor, and, what is of more consequence, to pay it well.

This leading proposition, being thus far satisfactorily ascertained, on comparison with the others, we are able to determine that that size of farms is most beneficial, in general, which secures the greatest produce *in the market;* or, in other words, converted into money. Now, in order thus to command a great surplus, above what is consumed by men and their families employed or depending on the cultivation, every species of good husbandry must be exerted. Lands already in culture must be kept improving; great stocks of cattle and sheep supported; every sort of manure that can be procured used plentifully; draining, irrigating, folding, hoeing, marling, claying, liming, inclosing, all must be exerted with activity and vigor:—no scrap of waste land left in a neglected state:—all improved; all pushing forward towards perfection: and the farmer encouraged, by the profit of his undertakings, to invest his savings in fresh exertions, that he may receive that compound interest so practicable for the good farmer. The sized farm that best effects all these works, will certainly carry to market the greatest surplus produce. I have attended, with great care and impartiality, to the result of this inquiry throughout the kingdom; and though in many provinces the husbandry is so infamously bad, as to yield a choice only of evils, yet I may safely assert, that on farms of 300 to 600 acres it is infinitely better than on little ones, and supplies the market with a produce beyond all comparison superior. But by farms I mean always *occupations*, and by no means such as are hired by middle men to re-let to little *metayers*.*

There is nothing strange in the bad husbandry so common on little farms; by which I mean such as are under 100 arpents, and even from 100 to 200; those proportions between the stock and labor, and the land, by which practical men will understand what I mean, are on such farms unfavorable. The man is poor; and no poor farmer can make those exertions that are demanded for good husbandry;* and his poverty is necessarily in proportion to the smallness of his farm. The profit of a large farm supports the farmer and his family, and leaves a surplus which may be laid out in improvements; that of a small tract of land will do no more than support the farmer, and leaves nothing for improvements. With the latter the horses are more numerous than with the former, and in a proportion that abridges much of the profit. The division of labor, which in every pursuit of industry gives skill and despatch, cannot indeed take place on the greatest farms in the degree in which it is found in manufactures; but upon small farms it does not take place at all:—the same man, by turns, applies to every work of the farm; upon the larger occupation there are ploughmen, thrashers, hedgers, shepherds, cow-herds, ox-herns, hog-herds, lime burners, drainers, and irrigators:—this circumstance is of considerable importance, and decides that every work will be better performed on a large than on a small farm; one of the greatest engines of good husbandry, a sheepfold, is either to be found on a large farm only, or at an expense of labor which *destroys the profit*. It has often been urged, that small farms are greater nurseries of population, in many instances this is the case, and they are often pernicious exactly in that proportion; prolific in misery; and breeding mouths without yielding a produce to feed them. In France, population: outstripping the demand, is a public nuisance, and ought to be carefully discouraged; but of this fact, glaring through the whole kingdom, more in another chapter. The farms I should prefer in France would be 250 to 350 acres upon rich soils; and 400 to 600 upon poorer ones.

England has made, upon the whole, a much greater progress in agriculture than any other country in Europe; and great farms have absolutely done the whole: insomuch, that we have not a capital improvement that is ever found on a small one. Let foreigners—let the Count de Hertzberg† come to England and view our hus-

* *Metayers* are a numerous and wretchedly poor class of tenants, who obtain not only the land, but the stock, seed, &c. from the landlord, and pay half the produce, as rent. Their system of tillage was generally of the worst kind, and the rent as high as such tillage could possibly pay. Ed. Farm. Reg.

* "Wealth," says a French writer, "in the hands of farmers becomes fatal to agriculture." *Essai sur l'etat de la culture Belgique*, 8vo. 1784, p. 7. Who can wonder at a kingdom being ill cultivated, that abounds with such politicians?

† That Minister says, in one of his discourses to the Academy of Berlin, "Cest le principe que le cultivateur Anglois Young soutient, dans son Arithmetique Politique, sur l'utilité des grandes sermes. M. Young parît avoir tort à l'egard d'un gouvernement republicain tel que celui de la Grande Bretagne, qui a plus besoin qu'un autre d'une grande population." Here, as in many instances, it is supposed, that large farms are unfavorable to population, because their produce is consumed in towns. Has the Count given any reason to make us believe, that the produce of a large farm consumed in a town, does not imply a population proportioned to its quantity, as well as the produce of a small farm, which is consumed by the people that raise it? As population is in proportion to food, those who

bandry:—let me have the honor of showing him that of our large farms, and then let Dr. Price conduct him to that of our small ones: when he has viewed both, he will find no difficulty in drawing conclusions very different from those which he has hitherto patronized. We have in England brought to perfection the management of inclosing, marling, claying, and every species of manuring. We have made great advances in irrigation; and should, perhaps, have equalled Lombardy, if the liberty of the people would have allowed as ready a trespass on private property. We have carried the breeding of cattle and sheep to a greater perfection, than any country in the world ever yet experienced. We have, in our best managed districts, banished fallows: and, what is the great glory of our island, the best husbandry is found on our poorest soils. Let me demand, of the advocates for small farms, where the little farmer is to be found who will cover his whole farm with marl, at the rate of 100 to 150 tons per acre? who will drain all his land at the expense of two or three pounds an acre? who will pay a heavy price for the manure of towns, and convey it thirty miles by land carriage? who will float his meadows at the expense of £5 per acre? who, to improve the breed of his sheep, will give 1000 guineas for the *use* of a single ram for a single season? who will give 25 guineas per cow for being covered by a fine bull? who will send across the kingdom to distant provinces for new implements, and for men to use them? who employ and pay men for residing in provinces, where practices are found which they want to introduce on their farms? At the very mention of such exertions, common in England, what mind can be so perversely framed as to imagine, for a single moment, that SUCH THINGS are to be effected by *little farmers?* Deduct from agriculture all the practices that have made it flourishing in this island, and you have precisely the management of small farms.

The false ideas, at present so common in France, are the more surprising, as no language abounds, with juster sentiments on many of these questions of political economy than the French. There cannot be juster, truer, or more opposite remarks on the advantage of great farms and rich farmers, than in the Encyclopædia.* Nor can any one write better on the subject than M. Delegorgue.† Artois, he observes, was universally under two crops and a fallow; but changed to a crop every year, by the old customs being abolished. So beneficial an alteration, not common in France, was founded on many and expensive experiments, which could be established only by means of the manures gained from large flocks and herds. By whom was this change effected? by little farmers, who can hardly effect their own support? Assuredly not. He further observes, that some parts of Artois are divided for the sake of a higher rent, and cattle are there sensibly decreased; also, that a country laborer is much happier than a little farmer. And I give him no slight credit for his observation, that little farmers are not able to keep their corn: and that all monopolies are in consequence of them; implying, that great farmers keeping back their corn is beneficial; but monopolies are equally beneficial, and tend as advantageously to remedy the evils that flow from little farmers being in too great a hurry to sell.

But however clearly I may be convinced of the infinite superiority of large farms, and that no country can ever be highly improved, by means of small ones, yet I am very far from recommending any laws or regulations to enforce the union of several. I contend for nothing but freedom; and for the rejection of those absurd and preposterous demands, in some of the French *cahiers* for laws *against* such an union. And let me add, that little attention should be paid to those writers and politicians, who under despotic governments, are so strenuous for a great population, as to be blind to much superior objects; who see nothing in the propagation of mankind but the means of increasing soldiers; who admire small farms as the nurseries of slaves—and think it a worthy object of policy to breed men to misery, that they may be inlisted, or starve. Such sentiments may be congenial with the keen atmosphere of German despotism; but that they should find their way into a nation, whose prospects are cheered by the brighter beams of new-born liberty, is a contradiction to that general felicity which ought to flow from freedom. Much too populous to be happy, France should seek the means of feeding the numbers which she hath, instead of breeding more to share a too scanty pittance.

Small properties.—In the preceding observations, I have had rented farms only in view; but there is another sort which abounds in almost every part of France, of which we cannot form an idea from what we see in England—I mean small properties; that is, little farms, belonging to those who cultivate them. The number is so great, that I am inclined to suppose more than one-third of the kingdom occupied by them. Before I travelled, I conceived that small farms, in property, were very susceptible of good cultivation; and that the occupier of such, having no rent to pay, might be sufficiently at his ease to work improvements, and carry on a vigorous husbandry; but what I have seen in France, has greatly lessened my good opinion of them. In Flanders, I saw excellent husbandry on properties of 30 to 100 acres; but we seldom find here such small patches of property, as are common in other provinces. In Alsace, and on the Garonne, that is, on soils of such exuberant fertility as to demand no exertions, some small properties also are well cultivated. In Bearn, I passed through a region of little farms, whose appearance, neatness, ease, and happiness, charmed me; it was what property alone could, on a small scale, effect; but these were by no means contemptibly small, they are as I judged by the distance from house to house, from 40 to 80 acres. Except these, and a very few other intances, I saw nothing re-

urge that great farms are injurious, should show that small ones raise a greater quantity; that is, are better cultivated; surely the assertion implies too gross an absurdity to be ventured. Frederic, who attained the title of Great, on account of his superior skill in the arts of slaughtering men, was, on military principles a friend to breeding them,—"confiderant que le nombre des habitants fait la richesse des souverains on trouva"—&c. *Oeuvre de Fred.* II. Tom. v. p. 146.

* Tom. 7, p. 821. Folio.

† Mem, sur cette question: Est-il utile en Artois de Diviser les Fermes? 1786, p. 7.

spectable on small properties, except a most unremitting industry. Indeed, it is necessary to impress on the reader's mind, that though the husbandry I met with, in a great variety of instances on little properties, was as bad as can well be conceived, yet the industry of the possessors was so conspicuous, and so meritorious, that no commendations would be too great for it. It was sufficient to prove, that the property in land is, of all others, the most active instigator to severe and incessant labor. And this truth is of such force and extent, that I know no way so sure of carrying tillage to a mountain-top, as by permitting the adjoining villagers to acquire it in property: in fact, we see that, in the mountains of Languedoc, &c. they have conveyed earth in baskets, on their backs, to form a soil where nature had denied it. Another circumstance attending small properties, is the increase of population; but what may be advantageous to other countries, may be a misfortune to France.

Having, in this manner, admitted the merit, of such small farms in property, I shall, in the next place, state the inconveniences I have observed to result from them in France.

The first and greatest, is the division which universally takes place after the death of the proprietor, commonly amongst all the children, but in some districts amongst the sons only. Forty or fifty acres in property are not incapable of good husbandry; but when divided, twenty acres *must* be ill cultivated; again divided, they become farms of ten acres, of five, of two, and even one; and I have seen some of half, and even a quarter of a rood, with a family as much attached to it, as if it were an hundred acres. The population flowing from this division, is, in some cases, great, but it is the multiplication of wretchedness. Couples marry and procreate on the *idea*, not the *reality*, of a maintenance; they increase beyond the demand of towns and manufactures; and the consequence is, distress, and numbers dying of diseases, arising from insufficient nourishment. Hence, therefore, small properties, much divided, prove the greatest source of misery that can be conceived; and this has operated to such an extent and degree in France, that a law undoubtedly ought to be passed, to render all division below a certain number of arpents, illegal. But what are we, in this view of the subject, drawn from actual and multiplied observations, to think of the men who contend, that the property of land cannot be too much divided? That a country is flourishing in proportion to the equal dispersion of the people over their territory, is the opinion of one celebrated leader* in the National Assembly; but his father was of different sentiments; with great good sense and deep reflection he declares, that that culture does not most favor population which employs most hands;* "c'est á bien des egards un prejugé de croire, que plus la culture occupe d'hommes plus elle est favorable á la population;" meaning, that the surplus of product carried to market is as favorable to population, by feeding towns, as if eaten on the fields that produced it, *ainsi plus l' industrie & la richesse des entre preneurs de la culture epargne de travail d'hommes, plus la culture fournit á la subsistance d'autres hommes.* Another deputy, high in general estimation, and at the head of the committee of finances, asserts, that the greatest possible division of land property is the best. Such gentlemen, with the best intentions, spread opinions, which, if fully embraced, would make all France a scene of beggary and wretchedness. Amidst a mass of most useful knowledge, of deep and just reflections, and true political principles, a tendency to similar ideas is found in the reports of the committee of *Mendicité*,† in which the multiplication of little properties is considered as a resource against misery. Nothing more is necessary, than to extend such ideas, by supposition to fact, to show their real tendency. There are 130 millions of acres, and at least 25 millions of people in France. Assign, therefore, to each person, its shares of that extent: call it (allowing for rocks, rivers, roads, &c.) five acres each, or 25 acres per family. When, by the first principles of the idea, which is that of encouraging population, the luxury, celibacy, unhealthy employments, prostitution and sterility of cities, are removed, and the plain manners of the country are universally established, every circumstance in natures carries the people to marriage and procreation: a great increase takes place: and the 25 acres gradually, by division, become 20, 15, 12, 8, and so on, perpetually lessening. What, on such a supposition, is to become of the superfluity of people? You presently arrive at the limit beyond which the earth, cultivate it as you please, will feed no more mouths; yet those simple manners,

* *De la Monarchie Prussienne*, Tom. iv. p. 13. The Count de Mirabeau in this passage agrees, that great farms, upon a given space of land, will yield the greatest possible production, at the least possible expense, but contends, that there is a multitude of little objects, which escape the great farmer, of much more consequence than saving expenses. It is incredible that a man of such decided talents should so utterly mistake the facts that govern a question, to which he has given much attention, at least if we are to judge by his recurring to it so often. Where does he find the fact upon which he builds all his reasoning, that little farmers make larger investments and expenses than great farmers? I will not appeal to England, in which the question is determined as soon as named; but I should wish to be informed, in what provinces of France the little farmers have their lands as well stocked as great ones? or as well cultivated? M. de Mirabeau completely begs the question, in supposing what is directly contrary to fact, since the advances of the great farms are more considerable, perhaps the double of those of the little ones; I am sure it is so in every part of the kingdom in which I have been. But the Count goes on to state how superior the little farms are, because so many families are found on the land, which is precisely the most powerful argument against them, as that merit admitted, implies at once the annihilation of towns and manufactures being beneficial to a modern state, provided the people be found in the country; a position I have sufficiently answered in the text.

* *L'Ami des Hommes*, 5th edit. 1760, Tom. v. p. 43. See also Tom. vi. p. 79. *Tableau Oeconomique.* See the same subject, handled with much ability, by one of the greatest political geniusses of the present age, *De L'Oeconomie Politique*, par Mons. Herrenschwand, 8vo. 1786, p. 275. And *Discours sur la division des Terras*, 8vo. 1786, Par le meme.

† *Premier Rapport*, 8vo. 1790, p. 6. *Quatrieme Rapport*, p. 9. These reports were made by the chairman, M. de la Rochefoucauld Liancourt, and do very great honor to his abilities and his industry.

which instigate to marriage, still continue: what then is the consequence, but the most dreadful misery imaginable! You soon would exceed the populousness of China, where the putrid carcasses of dogs, cats, rats, and every species of filth and vermin, are sought with avidity, to sustain the life of wretches who were born only to be starved. Such are the infallible effects of carrying into execution a too minute division of landed property. No country upon earth is cursed with so bad a government as that would be, which aimed seriously at such a division: so ruinous is that population, which arises from principles pure and virtuous in their origin, but leads directly to the extremes of human misery! Great cities have been called the graves of human species: if they conduct easily to the grave, they become the best *euthanasia* of too much populousness. They are more apt to prevent increase than to destroy, which is precisely the effect wanted in such a country as France, where the division of property has unhappily nursed up a population, which she cannot feed; what, therefore, would be the misery, if cities and towns supported their numbers, and left the whole surplus of the country regorging in the cottages? This is too much the case for the happiness of the kingdom, as we see in a thousand circumstances, and particularly in the distress arising from the least failure in the crops; such a deficiency, as in England passes almost without notice, in France is attended with dreadful calamities. There cannot be a more pleasing spectacle, or better framed to call into animation the sympathies of our nature, than that of a family living on a little property, which their industry cultivates, and perhaps created: it is this object, so touching to the best feelings of the human bosom, that has certainly made many writers indiscriminate advocates for small properties. If the industry of towns and manufactures were active enough to demand the surplus of all this population as fast as it arose, the advantages of the system would be clear; but France knows, by sad experience, that such a surplus is not demanded at present; what, therefore, would the consequence be of bringing a fresh one to market, while the old one remains on hand? It is idle to cite the example of America, where an immensity of fertile land lies open to every one who will accept it; and where population is valuable to an unexampled degree, as we see in the price of their labor; but what comparison, between such a country and France, where the competition for employment is so great, arising from too great a populousness, that the price of labor is 76 per cent. below that of its more flourishing neighbor? But, in considering this interesting subject, I shall recur, as I have done on so many other occasions, to the example of England. In this kingdom, small properties are exceedingly rare; in great numbers of our counties, there is scarcely any such thing to be found: Our laboring poor are justly emulous of being the proprietors of their cottages, and of that scrap of land, a few perches, which form the garden; but they seldom think of buying land enough to employ themselves; and, as in France, of offering prices so much beyond the value, as to ensure the acquisition; a man that has two or three hundred pounds with us, does not buy a little field, but stocks a farm: now, as our laboring poor are incomparably more at their ease, and in every respect happier than those of France, does it not appear to follow, by fair conclusion, that small properties are by no means necessary for the welfare of the lower classes in the country? in every part of England, in which I have been, there is no comparison between the case of a day-laborer and of a very little farmer; we have no people that work so hard, and fare so ill, as the latter.* Why then should this minute division be considered as so advantageous in France, while we in England feel the benefit of a system directly contrary? There are several reasons for this; the manufactures of France, compared with those of England, are not nearly so considerable respectively, in proportion to the population of the two kingdoms. Nor does the agriculture of France, which is carried on either by farmers or metayers, afford any employment comparable to that which English culture yields. Country gentlemen, in France, do not employ probably the hundredth part of the laborers that are employed by country gentlemen in England, who have always some works of ornamental gardening or farming going on, which gives bread to many people. An object, more important, is, that the prices of provisions are as dear in France as in England, while those of labor are 76 per cent. lower. We have another proof if any were wanted, how much too great the population of that kingdom is. The English laborer, who commands steadily eight, nine, or ten shillings a week, by working for a farmer, hazards much when he labors land for himself; and this fact is so strong, that the most industrious and hard laboring of our poor peasants, are not those who keep their gardens in the best order and cultivation; but such, on the contrary, as make inferior earnings, that mark something of debility. By means of these, and various other causes, the poor countrymen in England find a much more regular employment by day labor than those of France, who, having no resource in working for others, are obliged to work for themselves, or starve. And when gentlemen find them in this situation, no wonder they readily expatiate on the advantages of small properties being to such families the only resource that offers. But, in fact, the very height of operose culture upon such, and what appears perfection to a vulgar eye, can arise only from the misery of half employed people. The dearness of labor, very common in such a country, is no proof against this observation. No labor is so wretchedly performed, and so dear, as that of hired hands accustomed much to labor for themselves; there is a disgust, and a listlessness that cannot escape an intelligent observer; and nothing but real distress will drive such little proprietors to work at all for others; so that I have seen, in the operosely cultivated parts of France, labor comparatively dear, and ill performed, amidst swarms of half idle people. And here I should remark, the circumstance seen to so strange a degree in almost all the markets of France, that swarms of people regularly lose one day in a week, for objects that clearly show of how little value time is of to these small

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*The present miserable condition of the English laboring class, does not invalidate the author's reasoning. That misery is principally caused by the poor laws of England, a system even more calculated to increase population and wretchedness, than the minute divisions of land in France. ED. FARM. REG.

farmers. Can any thing be apparently so absurd, as a strong hearty man walking some miles, and losing a day's work, which ought to be worth 15 or 20s. in order to sell a dozen of eggs, or a chicken, the value of which would not equal the labor of conveying it, *were the people usefully employed!* This ought to convince us, that these small occupations are a real loss of labor; and that people are fed upon them, whose time is worth little or nothing.

There are many practices in French husbandry, that are apparently of considerable merit, yet cannot be recommended to other countries. I have seen them, in a part of Flanders, mattocking up every corner of a field where the plough could not come; and in the south of France, the peasant makes a common practice of mattocking up whole fields. In many parts of the kingdom all the land is digged. In the mountains of the Vivarais, terraces are built by walling, and the earth carried to them in baskets. Such practices, and a thousand other similar, spring absolutely from the extreme division of landed property, having nursed up a population beyond the power of industry to support; and ought to be considered as a proof of a real evil in the vitals of the state. The man who unhappily has existence in a country where there is no employment for him, will, if he has the property of a scrap of land, work for two-pence a day upon it: he will work for half a farthing: and, if he has an ardor of industry, for nothing, as thousands do in France. If he does not perform some business, upon his little farm, he thinks he does nothing: in such a situation, he will pick straws—he will take up a stone here, and lay it there: he will carry earth in a basket to the top of a mountain; he will walk ten miles to sell an egg. Is it not obvious to the reader, that such practices existing, and, if tolerably directed, producing an effect well calculated to command admiration from an extreme of culture, are in reality no more analagous to a well constituted country, if I may venture the expression than would the most preposterous practices to be fancied. You might as well go a step further in population, and hold up, with M. de Poivre, the example of the Chinese, as worthy of European imitation.

Upon the whole, one must be inclined to think, that small properties are carried much too far in France; that a most miserable population has been created by them, which ought to have had no existence; that their division should be restrained by express laws, at least till the demand for hands is equal to the production: that the system of great farmers regularly employing, and well paying a numerous peasantry by day labor, is infinitely more advantageous to the nation, and to the poor themselves, than the multiplication of small properties; in fine, it is obvious, that all measures which prevent the establishment of large farms, and wealthy farmers, such as restrictions or bars to inclosures, the existence of rights of commonage, and the least favor to little proprietors in levying of the land taxes, are ruinous to agriculture, and ought to be deprecated, as a system destructive of the public welfare.

From Chaptal's Chymistry Applied to Agriculture.

Of large and small Estates.

The question as to large and small estates has for some years occupied all minds in France. Some would unite all property in the hands of few families; others are willing to leave it to time and private interest to effect a suitable division, and one advantageous to the nation and the government.*

Large landed estates spring from the first institutions of monarchy; privileges, grants, and the divisions of inhabitants into classes, centre all property in the hands of a few; the rest of the population, condemned to servitude, is attached to the soil.

Gradually the serfs are freed; property is divided: but the new proprietors have been able to acquire and to possess only on burdensome conditions; their lands have been loaded with rents and imposts from which the first possessors were exempt, and thus two kinds of property are established.

While this state of things has continued, agriculture has made no progress: one class was too rich to perceive the necessity of improving their estates, the other was too poor to attempt it.

When the power of acquiring property has been given to all, and particularly when the law has equally protected all proprietors, and abolished all privileges attached to the soil, or to individuals, the result has been a division of property, and an advance in agriculture.

The revolution has had two results advantageous to land-owners; the first, that of effacing the last traces of inequality in property; the second, that of offering to the agriculturist an enormous quantity of lands, which he could purchase at a low price.

The natural consequence of this state of things has been to increase the number of landed proprietors, and the respectability of the farmer.

Is the division of the soil into small estates an advantage or an evil? That is the question which we are to examine.

Large estates have the advantage of affording scope for all the developements of agricultural industry. That which forms the basis of subsistence, and a large proportion of the raw material of manufactures, is here united in one grand scene of operation. The productions of a large domain not only suffice for the subsistence and support of the proprietor and his agents, but the surplus supplies the wants of all, and fills the public markets.

Add to this, that large proprietors are more enlightened than small ones, and, especially, better enabled, by their more ample fortunes, to attempt improvements.

There is, then, no doubt that large proprietors are desirable in France; but are we therefore to be alarmed at the increase of small farms? I think not.

If, as I have already said, large estates have been the necessary result of our ancient institutions, the division of landed property is the natural effect of those by which we are at present governed. The suppression of the right of primogeniture, and of all the burdens which weighed unequally upon different classes of proprietors, and the prosperity which has prevailed among the inhabitants of the country, have necessarily increased the number of land-owners; but will this increase be unlimited? No; it will stop when the advantage

* See the excellent Memoir of the Vicomte de Moel Vindé on this subject.

of extensive agricultural operations is more fully realized, and when the produce of the soil can no longer liberally pay the labor of which it is the object.

To elucidate this question, let us see what has taken place hitherto.

In districts devoted to the greater crops, the division of land has had no sensible effect: every where we find the same extent of agricultural improvement, and the supplies of cattle, corn, fodder, and wood for the market have suffered in no way.

In a very large number of communities of which almost the whole territory belonged either to the nobles or to the clergy, those of the inhabitants who were already proprietors have bought as much as suited their convenience, and those who were not proprietors have become so.

But it is particularly in districts devoted to the lesser crops, that the division of property takes place; there, almost all the labor is manual. The culture of the vine, and that of the different kinds of pulse, require particular care and intelligent superintendence. To this the small proprietor consecrates all his time; he labors at the best times and the most favorable seasons; he employs the rest of his time in laboring for the public.

Let us now observe the results of the division of the soil into small estates.

These results may be considered with reference to three points; the interest of agriculture, the welfare of the state, and public morality.

1. *The interest of agriculture.*

When a large proprietor directs his information and his wealth to agricultural improvements, this is without doubt advantageous to agriculture; but these examples are rare. The cultivation of a large domain is usually entrusted to farmers, who follow step by step the received methods, and do not venture to adopt useful changes, because the shortness of their leases does not permit them to hope to reap the benefits of them. It is rare too, that in a very extensive tillage, there is enough of hands, of manure, and of working cattle, to carry cultivation to its perfection.

It cannot be denied that the first interest of agriculture is to produce the greatest possible amount upon a limited extent of soil, and to furnish produce at the lowest price to the consumer; now, in this case, all the advantage is in favor of the small proprietor; he cultivates the soil himself, and brings to his labor all the interest of a proprietor; he labors only at the most favorable times, and gives his unoccupied time, for wages, to the work of others; the large proprietor is not at liberty to be thus guided by his convenience, he is hurried along and commanded by time and labor.

The small proprietor leaves no part of his ground unoccupied; he cultivates steep banks with pulse, plants potatoes in any vacant space in his vineyard; the large proprietor neglects all these details.

2. *The welfare of the state.*

It is generally admitted, that the large domains which have been divided in consequence of the revolution, produce much more than they did; that uncultivated lands, especially in the south, are now covered with noble vineyards; that prosperity has prevailed in the country from the increase of the number of proprietors.

These undeniable facts have produced important advantages; the increase of produce has furnished means for the subsistence of a more numerous population. Wealth, introduced among the inhabitants of the country, has enabled them to maintain their children, and give them a better education; the consumption of produce of all kinds has increased, and agriculture and manufactures have found larger markets for their products.

So long as twelve years ago (I write in 1826,) the amount of taxable quotas in the land-tax, was ten millions four hundred and fourteen thousand one hundred and twenty-one, according to the last lists furnished by the Duke de Gaëta. The taxable quotas under 500 francs amounted to nine millions nine hundred and fifteen thousand. Since that time the number of quotas has increased, and particularly the smaller ones. And never has the land-tax been more regularly paid.

Another advantage resulting to the state from the division of property, has been that of rendering changes more frequent, a natural result of the increased number of proprietors; these changes, as they become more numerous, bring much more money into the treasury.

According to the very exact verification made for five years by the department of indirect taxation, there were produced on an average, at the commencement of the century, thirty-five millions and six hundred thousand hectolitres* of wine: this amount has remarkably increased since that time, not only because the vine has continued to be planted, but because the culture of it has been improved; the case is almost the same as to all the produce of the soil. It cannot be denied that this increase of production is the result of the division of the soil into small farms. I have been for some time the proprietor of a pretty extensive vineyard, which I carefully cultivate, and I have constantly observed, that the small proprietors who worked for me raised at least double from an equal extent of land belonging to them; my produce, in truth, was of a little superior quality; but, at the market price, the quantity more than compensated for this difference in quality.

3. *Public morality.*

But it is particularly as it respects public morals that the increase of the number of small proprietors is advantageous. To be convinced of this, we need only compare the condition of the man possessing no propetry, with that of the possessor of property, however limited in extent.

The laborer without property is retained only by habit in the place of his birth; his two hands are his only property, and he places them at the disposal of him who pays best; he is entirely dependent upon the work he finds about him, and when employment fails, he changes without regret his place of abode, to seek it elsewhere. The institutions of his country are indifferent to him, because he takes no part in public affairs; he feels no interest in the preservation of order, because a state of disorder presents to him more favorable opportunities. Almost always discontented with his situation, he becomes restless, jealous, miserable; he accuses God and man, and seeks every opportunity which offers of rendering it better. Troubles, insurrections, robberies, assassinations are frequent wherever there are many laborers without property and few proprietors; and governments are forced to establish enormous *poor-rates*, as in England,

* See note, page 131.

or to supply the poor with food at the gates of convents or chateaux, as in Spain.

The subsistence of the laborer without property is never certain; the frequent diminution or suspension of labor in manufacturing establishments reduces him to misery, and promotes the developement of all the vices which result from it: the labors of the country vary with times and seasons, and do not offer constant employment to one not attached to the farm. His lot is then always variable and precarious.

The man without property who is single, commonly leads a dissolute and intemperate life; he who would have a family commonly becomes more unhappy; he cannot give his children a suitable education, and they soon contract all the vices of a depraved society.

The condition of the small proprietor is very different from this; he is rooted to the soil, and thence derives all the advantages of his situation. He works on his own land in his leisure moments, and devotes the rest of his time to earning wages on the estates of others. This double source of profit abundantly secures his existence and that of his family. His children and his wife co-operate in the culture of his little farm; idleness is banished from their household, and good morals, which are always the result of a laborious life, prevail there.

The small proprietor is interested in the maintenance of public order, because he would be a loser by trouble and disorder; he loves the institutions and the government which protect his property; he regards the welfare of others, because he would have others regard his own. His interest, his affections, his fears, his hopes, are concentrated and repose in that little spot of earth whose safety and prosperity are his only wish. He has in truth a country, whilst the other is a true cosmopolite, a stranger to all social interest.

Some appear to be alarmed at the increase of population attendant upon small proprietorship; but this increase of population is a certain sign of an increase of the means of subsistence and of the wealth of the inhabitants, whilst the diminution of population announces public misery.

In proportion as the population of the country increases, manual labor becomes more abundant, and produce increases in quantity and is reduced in price.

Thus, stripping the question of all that is connected with certain political considerations, the division of landed property is an advantage to agriculture, to the state, to public morals.

Men who take their opinion only from the past, would bring back property to its former state; but times are not the same, and a return to the ancient order of things is impossible. The division of property will continue to take place, so long as the small proprietor shall obtain more produce from a given extent of land than the large one, and so long as large owners shall divide their lands into small lots, to obtain a more advantageous sale of them; it is evident that a different result could be obtained only by reducing the destitute laborer to a degree of misery which would not permit him to economize with a view to acquiring property, or by prohibiting sales of land in small portions; now, the first of these means is contrary to justice and good morals, and the second to the rights of property.

When, in the session of 1825, the government proposed to re-establish the right of primogeniture, it had neither paid regard to the changes which had taken place since the revolution, nor to the respective rights of the different members of the same family. Formerly, almost all the large estates belonged to the most ancient families in the kingdom; they passed, undivided, into the hands of the eldest son, because the army, the clergy, or the order of Malta afforded rich endowments for younger sons, and convents offered great resources for daughters; but, at the present day, what would become of younger sons if the right of primogeniture were re-established? Deprived of the expedients offered by the old state of things, incapable of laboring upon the soil, they would live at the mercy of the head of their family. It is then particularly to old families, which, notwithstanding, it is meant to benefit, that the re-establishment of the right of primogeniture would be fatal.

Let us but leave it to time and to private interest, and the division of property will not pass the bounds prescribed to it by these supreme regulators of all things.

The division of estates will continue to take place, 1. in the vicinity of cities, where, from the constant attention bestowed on the soil, from the abundance of manure, the facility of transportation, the proximity of the market, and the certainty of a safe and advantageous sale, immense crops of vegetables and fruits of all kinds and of every season may be obtained my manual labor; 2. in vine countries, where the cultivation requires constant labor, and where the production is always proportional to the care bestowed upon the land; 3. in uneven lands, like valleys, mountains, &c. where cultivation is confined within narrow limits, and where the lands capable of it are separated by a barren soil.

In all these cases, the plough and working-cattle cannot be employed in labor; every thing is done by manual labor, and at most, the owner of each estate possesses a few cows and goats, and sometimes a few sheep, to secure subsistence, and increase the comfort of his household. We often find a numerous population assembled in those wild places where the soil seems to refuse any cultivation, and where the inhabitant, temperate and hardy, obtains, by industrious labor, crops which satisfy his wants and supply the neighboring markets. Those numerous countries, which are not capable of high cultivation, would be deserted without the assistance of the small proprietor; and it may be said, to his credit, that he creates produce in places which nature had devoted to the most complete sterility.

We no where see small proprietorships existing in places favorable to high cultivation. The vast domains of Beauce, Brie, Soissonnais, Upper Languedoc, exist undivided, and are always the granaries of France; the rich pasture lands of Normandy, Poitou, Anjou, &c. always maintain the same number of cattle; our large forests have remained untouched; population and the means of living have considerably increased; our markets are abundantly supplied; wealth has spread through the country; manufactures have made immense progress; taxes are paid regularly and without compulsion.

Let us beware of disturbing, by laws or regulations relative to property, this general harmony and public prosperity, which secure the happiness and prosperity of our country.

For the Farmers' Register.

FACTS OBSERVED CONNECTED WITH STEEPING SEED WHEAT.

In the latter part of last September, I had some conversation on the subject of sowing wheat, with a gentleman who cultivates a farm in the neighborhood of Petersburg, and who, in addition to his general very neat management, and the high improvement of his land, is celebrated for making remarkably heavy and clean crops of wheat—usually on a green or manure crop of field-peas or buckwheat. He stated his belief that his practice of steeping his seed in a saturated solution of salt for 18 hours, (and he did not fear danger from 24 hours,) and then dusting it with quicklime, and stirring the wet heap with shovels until every grain was partly covered, was not only a safeguard against smut, but against the attack of the Hessian fly. He had been induced to believe that the eggs of this insect were deposited on the grains of wheat, and that if destroyed (as supposed) by his process of steeping, &c. that the crop would be safe from that source of danger, however early the sowing. He had not examined particularly for the presence of maggots—but he had never found his harvests apparently lessened by their ravages, not even in the last crops (1835) which was so generally and greatly injured by the fly. His crop of that year had been almost ruined by *rust*, (induced probably by the great luxuriance of growth,) but he had not noticed any damage from the fly.

In passing along the road by the side of his field, I had myself witnessed the heavy and beautiful crops made every year; but still was not prepared to admit the absence of the fly, or the value of the supposed safeguard against them. I attributed their apparent harmlessness to the great fertility and excellent tillage of the land, which, with very thick sowing, enabled the crop to withstand the ravages of the fly, and even to conceal their existence from slight observation. I requested my friend to search for the maggots on the young plants—and accordingly, before six weeks had passed, he was enabled to find them in such plenty as to prove that his usual steeping process had not been the cause of his apparent exemption from loss of this kind.

But however incredulous I was as to this supposed effect, I considered it worth testing by experiment: and the more so, as I knew from experience that the process was valuable as a security against smut, and beneficial otherwise in cleaning the seed of all matters light enough to swim in strong brine. In addition to steeping and liming my whole quantity of seed wheat, with some variations of method, the following experiment was made on a small scale, which presented a result totally unlooked for, and which induces me to offer these observations.

The latter part of September 1835 was so unusually cold, that I thought (though very erroneously) that we might venture to begin to sow wheat on October 1st, as safely as in ordinary years on October 10th. I began my sowing September 30th. On that day, I took a handful of my seed wheat, and put about half in a glass of water, saturated with common salt. It stood 22 hours, then was taken out, drained, and, while wet, dusted with as much quicklime as would stick to the grains: 100 of these were placed on wet cotton, floating on half a pint of water in a glass—the water fresh and pure, except for the salt and lime adhering to the grains. Several hundred grains that had not been steeped, nor made wet previously, were placed in like manner on cotton in another glass—and both kept in my house, in the like exposure. At the same time, the remaining steeped grains, and the dry, were sown side by side, in two rows, and covered about an inch deep. The earth was then remarkably dry for the season: yet the sprouts from the dry grains came up about 24 hours before the steeped, though the latter had been kept wet 22 hours before both had been put in the ground. A like result was observed, and about as much difference in time, between the first sprouting of the two parcels in the glasses.

As the sprouting was so evidently retarded by the steeping, the doubt arose, and still remains unsettled, whether the germinating power was not weakened as well as retarded—and in some measure, totally destroyed. I can only state the imperfect results so far as known—and do so to strengthen my request of others, to aid in more full observations next season. I could not tell whether any of the steeped grains which were sown, had failed to sprout, as the number had not been noticed before sowing them. Of the 100, floating on cotton, sprouts continued to rise for 16 days after so placing the grains—and at that time about 19 grains still had not sprouted. However, some of them, or possibly all, might have done so if the experiment had been continued. In placing grains on floating cotton, some will be too deeply immersed; and that will prevent sprouting. I only know that more than four-fifths *did sprout*—and that all of the hundred grains were alike treated in the steeping and liming.

The difference of size in the growth of the two drills soon became imperceptible—and by the end of October, it seemed to me that the growth from the steeped grains was decidedly the most vigorous and luxuriant of the two. In this, I may have been deceived—but two other persons concurred with me in the opinion. Being afterwards exposed to the grazing of cattle, no later observations could be made. But the object of the experiment as to the fly, had been previously obtained. Maggots were found, in equal plenty, on the steeped row; and not one was found on the grains not steeped, which grew in the glass in my house, until the shoots were 6 inches high. It was a fair inference, that if the eggs were on the grains, the maggots ought to have been found on these plants, as plenty as if exposed out of doors; and such is stated to have been the result, in the experiments of other persons.

In the meantime, my first weeks' seed had been equally exposed by steeping 18 hours or more in brine, before being limed. Whether it was thereby injured, could not be positively known. But either from that cause, or too little seed being used, the crop came up much too thin—and was afterwards greatly injured by the fly before the commencement of weather cold enough to suspend their depredations.

E. R.

THE GASTON AND RALEIGH RAIL ROAD.

We cannot too strongly recommend to the attention of our readers the following communication from the pen of a gentleman thoroughly acquainted with the subject he discusses, and whose calculations, based as they are upon sure data, are entitled to implicit confidence and respect. There cannot exist the slightest doubt as to the advantages held forth by this magnificent enterprise of internal improvement, and as little that the citizens of Petersburg would reap a rich harvest from its successful completion. We say then to our fellow citizens, avail yourselves of this opportunity of making a profitable investment, and of enlarging the business, the commercial importance, and the character of your town.—*Ed. Int.*

From the Intelligencer.

Messrs. Editors:—We have been going on very quietly with the subscription to the Raleigh and Gaston Rail Road Company—little has been said and much done. But so much may be said in favor of the scheme that I think it would be proper to publish in your paper some of the reasons on which the friends of the work rely to recommend it to public favor.

Our own citizens have certainly shown a great degree of public spirit in the readiness with which they have come forward and lent their aid to the enterprise. If, however, they would but examine into the matter closely, they would find that they have not only secured lasting and almost incalculable benefits to the town: but they have actually made such a speculation as seldom falls to the lot of man. They have secured great benefits to Petersburg, they have placed the rail road which we have already made, beyond the reach of adverse fate, and they have invested money which will certainly yield them 15 per cent. I will venture to predict that there is not a man among us who will not regret three years hence that he did not invest in this road to the utmost extent of his power. I have had every means of sifting this matter well, and the more thoroughly I examine into the subject, the more firmly am I convinced that this is one of the most brilliant schemes which has ever been brought before our public.

In making a conjectural estimate of the income to be expected from this road, we have data which give our calculations a great degree of certainty. The travel and the trade now passing over the Petersburg Rail Road will serve as a guide in making an estimate of the income of the Raleigh and Gaston Rail Road. Let us take the travel for instance. There is at this time, an average of 21 passengers passing each way daily on the Petersburg road. I believe that this will bear a very small proportion to the number which will pass over the Raleigh and Gaston road. When this road goes into operation the northern and southern travel, which is now divided between several routes, will, in a great measure, be secured to this. Passengers who now travel by steam-boat from Charleston to New York, those who travel in the Piedmont line of stages, and even those who go out from Baltimore and down the Ohio river to New Orleans, will, many of them, come through this road. So that the amount of travel now must bear a very small proportion to what there will be eventually. But as it is best to err on the safe side in a matter of such moment to us, I will suppose that the travel on this road will amount to 35 daily each way.

With regard to other sources of revenue I will mention some facts. In a good crop year there are about 42,000 bales of cotton sold in the Petersburg market of which heretofore 12,000 only have been brought in on the rail road. The whole amount of cotton raised in Virginia for the Petersburg market is believed not to exceed 10,000 bales. Even supposing that none of this 10,000 is included in the 12,000 bales brought in on the rail road, there are still 20,000 bales which are brought in wagons to Petersburg. I need not tell any one who knows any thing of our market, that the whole of this crosses Roanoke at and above Gaston. We may safely calculate then on 20,000 bales of cotton. Indeed no one who is acquainted with the country through which the Raleigh and Gaston Road passes would doubt for a moment that there will be a very large increase. Large districts of country which have never heretofore sent any thing to Petersburg will send cotton on this road.

With regard to tobacco, another important item, I will mention the simple fact that this road will approach within 80 miles of the valley of the Yadkin, one of the most fertile regions in the United States: that the soil there is peculiarly adapted to the culture of tobacco and that the greater part of it now goes in other directions—some wagoned 150 miles. So well is the exhaustless wealth of this district of country known, that there is no doubt of a rail road being made to connect it with the Raleigh and Gaston Road.—Of the amount of tobacco raised in this valley, I can only form a conjecture. I see nothing extravagant in estimating it at 15,000 hogsheads. Tobacco is made throughout the country through which the rail road passes, and much of the tobacco raised on the Yadkin will at once be brought to this road. Eventually the whole of this country will seek a market through this channel. But, if we only calculate on the country which will certainly and immediately bring its produce to this road, few will think me too sanguine in expecting 5,000 hogsheads.

From the data thus obtained I give below an estimate of the probable income of the Raleigh and Gaston Rail Road.

35 Passengers out and in daily $10 each, - - - -	$127,750 00
20,000 bales cotton $1 each, -	20,000 00
5,000 hogsheads tobacco $4 each,	20,000 00
Mail, - - - -	15,000 00
Merchandize, - - -	10,000 00
	$192,750 00
Annual Expenses, - -	50,000 00
	$142,700 00

Which is nearly 18 per cent. on the capital stock of $800,000, and, even if the cost of the road reaches $1,000,000, this income would be more than 14 per cent. There is no reason to believe that the cost of the road will exceed $800,000.

I would mention also Messrs. Editors, that there are many things not taken into this account which will be transported on the road. Flour, wheat, corn and pork will probably constitute considerable items in the income. Large quantities of land will actually be brought into cultivation by the construction of this road: grain, which, from the present cost of transportation, cannot be raised for market, will become an important staple in this country. In short there is no limit to the income of this road but the one prescribed by law: and that allows them to divide 15 per cent, a limit which will soon be reached. Such being the case, I see no scheme which would offer greater chances of profit and less risk, and in which a prudent man would sooner invest. Having commenced for the good of the town, let us increase our subsciptions for the benefit of our private purses.

I said we have done much Messrs. Editors, but the work is not yet finished: we must push on and add to our subscriptions. The world is slow in opening its eyes even to such prospects as this work holds out. Petersburg took the lead in the venture and she must move onwards. One motive which should urge us to exert ourselves is that, by commencing with a large amount of money, the work will progress rapidly to its completion. I am informed that, if we can begin with spirit, the bridge over the Roanoke and thirty miles of the road will be finished in twelve months; and that the stockholders may expect a dividend in eighteen months from this date.

PETERSBURG.

FORMATION OF OXALIC ACID IN SOILS.

[In presuming to retain the signature to the following extract from a letter, of which the publication was not authorized, and probably not designed by the writer, we take a liberty which is a rare exception to our general practice. But we hope that the circumstances offer a sufficient apology. The subject mentioned is both novel and important to agricultural science—and is one that requires all the light that can be thrown on it: and the interesting matters of facts and of reasoning stated below, concisely as they are mentioned, will be the more sure to be read with interest, when known to proceed from Professor Renwick.]

To the Editor of the Farmers' Register.

Columbia College, New York,
January 28, 1836.

I have received your letter, and the accompanying package of two volumes of your Farmers' Register, and a copy of the Essay on Calcareous Manures. I have communicated to our president, the receipt of this very interesting donation for the College Library, and am directed by him, to return you thanks in the name of the trustees.

I had before seen and perused with much pleasure, the first edition of the Essay on Calcareous Manures. You have made a most important advance in the theory of this subject, and the success of your practice under it, taking into view all the circumstances of an original experiments prove, that your theory is in all respects consistent with the operations of nature.

On one point, I would beg leave to confirm the justness of your views, namely, in relation to the existence of oxalic acid in soils, which you, with all the becoming diffidence of an inductive inquirer, leave for further proof. In confirmation of the views you at first stated, I have to mention that it is well ascertained by chemical analysis, that the soda which is obtained from the ashes of the *salsola*, (barilla,) exists in the living plant in the form of oxalate of soda. The formation of this acid in calcareous soils, may be readily accounted for—when we consider what takes place in artificial nitre beds. These unquestionably absorb the two elements of nitric acid from the atmosphere, not in the proportions in which they exist there, but in the exact proportions necessary to form that acid.* This acid, if thus absorbed by a soil rich in vegetable matter, would convert the vegetable principles into oxalic acid. In spite of these corroborative views, however, it might be well to test them first, by actual experiment.

* * * * At the time I received your letter, I was about sitting down to inform you, that at the instance of Mr. ———— of Genesee, I had undertaken to edit an edition of your translation of the article on lime. I had declined this, as indelicate, until he had assured me of your assent: and my object in writing, was to thank you for the permission.

JAMES RENWICK.

From the Providence [R. I.] Journal.

AN EXUBERANT ORCHARD. VALUE OF FISH MANURE.

Towards the close of last summer we visited several times the orchard of Mr. Thomas Greene, of Pawtuxet, as one of the most beautiful exhibitions of fructification we have ever beheld. Most of the trees were so laden with apples of the fairest quality as to require a prop under each limb, and some of them were so entirely curtained with fruit as to resemble a heap of apples resting upon columns. The orchard stood upon about an acre of ground, and contained thirty-five trees. Eight of these trees were small, from which, we have since been informed by Mr. Greene, he gathered only from a bushel to a bushel and a half to a tree. From three of the other trees he gathered 27 bushels each. The whole product of the orchard was a little over 400 bushels, out of which, after having dried 12 bushels, he made 12 barrels of cider, and sold 60 bushels of fall apples, Mr. Greene informs us he has 220 bushels of winter apples in his cellar. During the summer he also took two tons of millet hay from the same acre of land. But what is the most remarkable fact in the history of this orchard is, as we are assured by Mr. Greene and some of his neighbors, that when the land upon which this orchard stands came into his possession, it was an unproductive, drifting sand flat, upon which there was no vegetation except such bushes as had been planted upon it by his

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* The two principal (and almost only) ingredients of atmospheric air, are oxygen and nitrogen, in a gaseous state, and mixed together in uniform proportions—and these two bodies, in different proportions, and *chemically combined*, also form nitric acid.—ED. FARM. REG.

father to prevent the wind from blowing the sand about. Outside of the orchard fence the land is still a naked white sand. But this small waste has been brought to its present state of almost unexampled fertility, solely by the application of fish as a manure. Mr. Greene says he ploughs in about 45 barrels of fish per year, costing generally from eight to nine dollars, and that if he should omit this application of manure for a few years, the soil, which is now of a dark yellow color, would doubtless bleach out again to the quality of white sand, and become unproductive as ever. So much will good husbandry do towards causing "the desert to blossom like the rose."

[The remarkable and interesting fact presented above furnishes an example conveying valuable instruction, and at the same time, an exhibition of gross ignorance, and waste of the great but fleeting fertility produced. The natural situation of the land described, has scarcely its equal in Virginia, Maryland, or North Carolina, unless on some of the bare sands of the sea coast and islands—and there, the rich annual manure of fish (worthless for other purposes,) may be often obtained in great plenty, and perhaps as cheaply as in Rhode Island. But it is not this application of manure, however profitable it may have proved, that we recommend, so much as its preservation, which is entirely disregarded in the practice above stated. Instead of fruit and hay, as rich harvests might be reaped of any other crops not unsuited to a sandy soil, by means of such manurings. But they must be continually repeated—because the almost purely silicious soil has neither chemical nor mechanical power to retain the rapidly decomposing animal matter. The crops seize on its products as they are in the act of escaping into the air—and if not so arrested by a growing crop, they would equally escape, and without causing any benefit, would leave the soil as barren and naked as it was at first. No doubt, much the greater part of what was applied has escaped, notwithstanding the benefit produced by the portion arrested. But if, in addition to furnishing this ample supply of animal matter, shells or lime had been applied to make the soil calcareous, it would have seized on and combined chemically with all the putrescent matters now wasted, and the soil would have been made fertile permanently, (if cultivated judiciously afterwards,) without repeating the heavy and costly dressings of fish.

The waste of animal manure is so great, where it is used alone, and the profit of combining it with calcareous earth would be so important, that we may be excused for having so often, in different forms, urged this matter on our readers. But if we have annoyed those who read, by such repetitions, we fear it has been done without any compensating benefit elsewhere: as we doubt whether any of such instruction has been seen, or heard of, by any of the persons most interested. Yet we will venture to assert, that if this one effect of the action of calcareous earth was known, and made proper use of, in the limited space where fish or similar manures can be used, that the profit thence derived would surpass all the cost of this journal, incurred by all its subscribers, from its commencement to this time.]

From *British Husbandry*.

ON PUTRESCENT MANURES.

[Continued from p. 590, Vol. III.]

Long dung.

Such is the most common practice with the generality of farmers regarding *fermented dung;* but there is another system of management advocated by some eminent chemists, who recommend that it should be used in a *fresh state*—that is to say, after it has begun to ferment; for it is well known that dry vegetable and animal matter cannot be properly made to serve as manure until that process has commenced. On the effects of the fermentation of farm-yard manure, and the length to which the operation should be carried before it be applied to the soil, there exists indeed an extraordinary difference of opinion among the written authorities on the subject, and the practice of many eminent farmers is equally at variance. It was long ago asserted, that 'there was good reason to believe, from many facts, that putrefaction was no way necessary to the nutritive power of animal and vegetable matter, but in so far as it diminishes their cohesion, or destroys their texture, and renders them fitter for absorption; and as there is considerable waste in gases and ammoniacal and nitrous salt by their putrefaction, it is of importance not to allow the putrefaction to take place at all where it is not required to break the texture.'* In support of that theory, various other authorities were quoted by the late Secretary to the Board of Agriculture, in the treatise on manures which gained him the Bedfordian medal of the Bath and West of England Agricultural Society.† Many who previously doubted it have been since persuaded of its superiority by much practical as well as theoretical evidence then brought forward; to which there has been since added the powerful arguments of Sir Humphry Davy, who thus expresses himself:—

'Whoever will refer to the simplest principles of chemistry cannot entertain a doubt on the subject. As soon as dung begins to decompose, it throws off its volatile parts, which are the most valuable and most efficient. Dung which has fermented, so as to become a mere soft cohesive mass, has generally lost from one-third to one-half of its most useful constituent elements; and that it may exert its full action upon the plant, and lose none of its nutritive powers, it should evidently be applied much sooner, and long before decomposition has arrived at its ultimate results.

'A slight incipient fermentation is undoubtedly of use in the dunghill, for by means of it a disposition is brought on in the woody fibre to decay and dissolve when it is carried to the land, or ploughed into the soil, and woody fibre is always in great excess in the refuse of the farm. Too great a degree of fermentation is, however, very prejudicial to the composite manure in the dunghill; it is better that there should be no fermentation at all before the manure is used than that it should be carried too far; for the excess of fermentation tends to the destruction and dissipation of

* Dr. Pearson's Notes on Cullen, quoted by Arthur Young in his treatise on manures, chap. vii.

† See the Papers of the Society, vol. x. art x.

the most useful of its parts, and the ultimate results of this process are like those of combustion.'*

The sentiments of this celebrated chemist are certainly entitled to great weight; but though we admit that the fermentation of farm-yard manure may be rendered injurious, both through the waste which occurs in bulk,† as well as by the loss of some portion of its nutritive properties, if that process be carried to excess, yet we are inclined to doubt the correctness of that position which says 'that it should be applied long before decomposition has arrived at its ultimate results.' We think, also, that some distinction should be drawn between the different kinds and qualities of dung, as well as of the crops to which it is to be applied, and of the season in which it is to be used, before any such unexceptionable rule should be adopted for its preparation. Thus, to recommend the application of fresh manure for a crop of turnips, in like manner as for another of potatoes—for heavy clay equally as for a light sandy loam, or to draw no distinction between the time in which it is to be laid upon the land—rather affords evidence of theoretic generalization than of sound conclusions drawn from a multiplicity of well-supported experiments, and established by practical effect.‡

There are perhaps few agricultural subjects on which theory and practice are so much at variance as in the management and application of putrescent manure. There is hardly a farmer who will not admit that a crop of turnips may be altogether risked if short muck be not employed; and though some of them are often under the necessity of applying a portion of long dung perhaps to the same field on which the former has been laid, yet the very drill on which the two kinds meet may in general be distinctly pointed out, while potatoes, on the contrary, are almost invariably planted on fresh farm-yard manure: though neither of these instances prove either that fresh dung gains any fertilizing power by fermentation, or that short muck loses it; for these facts apply only to the mechanical action of the manures, and to the natural economy of the plants. It is also generally admitted that long dung is more suitable to clay lands than to light soils, which are rendered too porous by its application; and, in like manner, fresh manure is objected to for all spring crops, because it is found to keep the land in too open a state in dry weather, and liable to be burnt up in the summer.

Sir Humphry, however, adds—'that the *dry straw* of wheat, oats, barley, beans and peas, and spoiled hay, or any other similar kind of dry vegetable matter, is, in all cases, useful manure. In general, such substances are made to ferment before they are employed, though it may be doubted whether the practice should be indiscriminately adopted.'

On which it may be observed that although in another passage he admits 'that a great objection against slightly fermenting dung is, that weeds spring up more luxuriantly where it is applied,'—which forms in itself a strong impediment; yet that is not the only fault to which it is exposed—for it also occasions foul husbandry. It is scarcely possible in any soil to plough down effectually a large quantity of rank strawy manure; for even the stubbles, when cut high, are found difficult to bury, and more especially on light land this fresh stable dung slides along the ground before the breast of the plough, and thus clogs the furrow. The harrows also drag up considerable quantities, which not alone impede their action, but a large portion of the manure is thus scattered over the surface of the ground, and uselessly left there to perish; and litter that had been ploughed down fresh has, in numerous instances, been turned up in the following spring without any apparent change. Objections such as these are not easily obviated, but even were they surmounted, the value of the dung in that state of preparation still remains to be considered.

Of the mysteries of nature in her supply of food to plants we have no certain information, and it is even probable that they will ever elude discovery. Some experiments which were made by Sir Humphry Davy, however, favored the opinion 'that *soluble matters pass unaltered into the roots of plants;*' in support of which he says—'that the great object in the application of manure should be to make it afford as much soluble matter as possible to the roots of the plants, and that in a slow and gradual manner, so that it may be entirely consumed in forming the sap of the organized plant;' in order to attain which effect, he admits '*that it must undergo chemical changes.*' Now, the materials of which the great bulk of farm-yard manure is composed, consist chiefly of straw or other litter, which, being fibrous, can only be rendered soluble by fermentation: but chemical theorists assert that this process should be perfected at least, if not commenced, under ground; for they insist that, if completed in the dunghill, it would occasion a great loss of nutritive matter; and it must be admitted that several practical men of considerable judgement have become converts to the same notion. Thus, one of the latter body says—'that, although half-rotted manure will sooner disappear in the soil, and that the crop sown along with it may often be better than on fresh dung improperly applied, there may be little doubt; but there can be as little that, during the time the latter is visible, it has afforded the greatest share of nourishment;' and he then asserts, 'that the ravages of fermentation and exhalation are more to be dreaded, and ought to be more guarded against, than any other waste to which a heap of dung is liable.'*

In contradiction to this, however, another writer upon the same subject thus expresses himself:—'the object of applying all kinds of manure is to nourish the seed which is sown in the earth; and we know from observation that its developement is much accelerated by the immediate assistance of manure. If manure requires to be in a soluble state before plants derive benefit from it, it is evi-

* Elements of Agricultural Chemistry, lect. vi.

† See, however, the note in p. 239.

‡ On this it has been observed, that, in the instance of turnips, Sir Humphry only meant to say, 'that the manure should be applied long before decomposition had arrived at its ultimate results:' but this does not weaken the general force of our remark, which refers to the indiscriminate use of long dung.

* Finlayson's British Farmer and Ploughman's Guide, 2nd edit., pp. 65, 68.

dent the greater state of solution in which the manure is, the more easily will the plant be enabled to derive benefit from it. This point is finely illustrated by the quicker efficacy of liquid than solid manure in nourishing the plant, when both are applied in equal strength. Now, if there is no way of making manure soluble but by fermentation, it is also evident a great degree of fermentation will dissolve all the fibrous portions of putrescent manures the more easily. This point is also well illustrated by a fermented dunghill, the materials of which, if properly commixed, will ferment strongly for a time, and then the fermentation will subside to a low degree, leaving the whole mass in that pulpy, sappy state, than which nothing can give a better idea of a soluble state of a fibrous body. Whether any really nutritive matter is driven off by fermentation before the mass is brought to that pulpy state, may be doubted; for the evaporation from such a dunghill appears to be just the steam of water in a highly elastic state, glimmering like a hot haze in a sunny day, on looking across a ploughed field. But even should some gaseous matter escape during fermentation, this undeniable fact remains untouched—that this fermented, pulpy, sappy mass of manure will go much further in maintaining the fertility of land than the same bulk, or weight, of recent farm-yard manure.'*

On the latter point we think there can be no rational doubt; for it is very generally allowed that an equal quantity of short muck, or that which has been merely reduced to the state of spit-dung, is more immediately effectual as manure to the present crop: but the question still remains to be decided—whether the same amount of substance, if laid upon the land previous to its diminution by the loss of fluid and of gaseous matter, has not a more lasting effect on the improvement of the soil? It can only be determined by long experience upon different soils, seasons, climates, crops, and rotations; and we agree with Mr. Finlayson that, 'in order to make a fair trial, it might not be unworthy of the agriculturist's pains to place, for example, a ton of fresh dung in a favorable situation for fermentation; to turn it over once or twice; and when rotted down to the bulk, weight, and consistency thought most expedient, or usually allowed, to put it and a ton of fresh dung of the same sort on equal spaces of very poor land, and weigh the produce of the three following crops; by which means the matter would soon be set at rest, and, with the majority of farmers, a greater uniformity observed in the management of this division of their business.' We accordingly extract a comparative experiment made by an intelligent practical farmer on three kinds of manure, and on a cultivated soil without manure—half a rood of ground being allowed for each:—as follows:—

Successive crops and produce from a single application of the following Quantities, viz:—

	Fresh stable-dung in a straw state, 3 tons. Per acre.	Rotten dung, 8 months old, 2 tons. Per acre.	Dry barley-straw, burnt on the ground, 15 cwt. Per acre.	No manure. Per acre.
1st crop, Turnips,	18 cwt. 6st, 6 lbs.	16 cwt. 1st. 4 lbs.	8 cwt. 3st. 7 lbs.	1st. 8 lbs.
2nd crop, Barley,	30 bush. 2 pks.	36 bush. 3 pks.	30 bush. 1 pk.	14 bush. 3 pk.
3rd crop, Clover,	20 cwt.	21 cwt.	18 cwt.	8 cwt.
4th crop, Oats,	38 bush.	40 bush.	18 bush.	32 bush.

As to the feed after the clover, it was about equal to the expense of getting in each crop respectively, with a small surplus on the plot manured with rotten dung.

To complete this experiment, there should, however, have been a notice added of the proportion of weight which fresh stable-dung would lose within eight months; for three tons would scarcely, at the expiration of that time, amount to more than half that quantity of completely rotted dung; though when farm-yard manure is reduced one-third in weight, the fermentation may be, in most cases, considered as far enough advanced for the general purposes of agriculture. Supposing the original quantities to have been equal, the above experiment would be, in every part of the rotation, in favor of rotted dung, with the exception of the inferiority of the turnip crop, which, in this instance, remarkably contradicts the practice of its application; though, without more clear information regarding the soil, the culture, and the weather no positive conclusion can be drawn from that fact.†

In his remarks upon the *formation of dung-heaps*, Sir Humphry justly observes—'that an immeasurable quantity of substance disposed for conversion into food for plants is suffered to escape in the form of drainings and vapor. During the violent fermentation which is necessary for reducing farm-yard manure to the state in which it is called "*short muck*," not only a large quantity of fluid, but likewise of gaseous matter, is lost; so much so, that the dung is reduced one-half, and from that to two-thirds or more, in weight. Now, the principal elastic matter disengaged is carbonic acid, with some ammonia; and both these, if attracted by the moisture in a soil, and retained in combination with it, are capable of becoming nutriment.' Reasoning on which, he says—'that, within the last seven years, Mr. Coke has entirely given up the system of applying fermented dung; and he informs me, that his crops have been as good as ever they were, and that his manure goes nearly twice as far.' He then sums up his arguments with directions for the management of putrescent manure, in the following terms:—

'Where farm-yard dung cannot be immediately applied, the destructive fermentation of it should

* Quarterly Journal of Agriculture, No. xix. page 82.

† See a very able inquiry into Sir Humphry Davy's theory in a treatise on soils and manures, Anon., p. 146.

* British Farmer and Ploughman's Guide, 2nd edit., p. 68.

be prevented as much as possible. For this end the dung should be kept dry and unexposed to the air; for the moisture and contact with the oxygen of the atmosphere tends to excite fermentation. To protect a heap from rain, a covering of compact marl, or of a tenacious clay, should be spread over the surface and sides of it. Watering dunghills is sometimes recommended for checking fermentation; but this practice, although it may cool the dung for a short time, is inconsistent with just views, for moisture is a principal agent in all processes of decomposition: dry fibrous matter will never ferment. Water is as necessary as air to the process, and to supply it to fermenting dung is to supply an agent which will hasten its decay.' 'If a thermometer plunged into the dung does not rise above 100° of Fahrenheit, there is little danger of much aeriform matter flying off; if the temperature is higher, the dung should be immediately spread abroad.'

There is no ground for contesting the fact that a large quantity of fluid and of gaseous vapor is allowed to escape during the common process of reducing farm-yard manure to the state of short muck; but the practical inference deduced therefrom can only be proved by experiments on a much broader scale than those which have been yet submitted to the public.

The separation of a rich fluid substance, drained from a mass of dung, must, doubtless, diminish the fertilizing power of the manure in the proportion in which it has been extracted: but these drainings can either be preserved in tanks, and afterwards either thrown over the heap, or applied to the land in their liquid form; or, should the construction of such reservoirs prove inconvenient, the waste of the liquor may be prevented by raising the dunghill in the manner already stated in our account of the preparation of farm-yard manure. The application of moisture cannot be considered as a loss; and we have already seen that even that of watering dunghills is sometimes necessary to prevent them from becoming fire-fanged.

The escape of gaseous matter is caused by the heat created by fermentation; and if we look to the state of a farm-yard, we shall find that the moment the dung is thrown out, trampled upon, and wetted by the cattle, that process is commenced, although the temperature of the heap should be far below 100°. But although the bulk of the manure is thus diminished by the evaporation, yet the effect upon vegetation of the ammonia contained in the vapor has not been conclusively ascertained —nor is there any proof that animal and vegetable substances, while in a state of fermentation, contribute to its support; for it appears, from numerous experiments, that rank manure, although forcing the early growth of living plants, yet eventually contributes to their premature decay. Practice has long since decided that it is injurious to turnips, to which crop it is more profusely applied than to any other:* it renders corn crops foul: and on light and poor land which, containing but little nutriment in the soil, requires all that can be furnished to it by the manure for the support of the present plants, its effect, though often seen to occasion them to push forth with great apparent vigor, yet frequently leaves them deficient in grain, and subject to rust. The potato is, indeed, almost the only plant to which it has been found decidedly friendly; but even that is in many soils known to succeed better with short dung.

Respecting the *effect of unfermented dung on Mr. Coke's crops*, it has been observed, in the treatise to which we have already alluded,* that the statement is only entitled to weight upon the construction either that some of the manure made on the farm that was expended under the old system is disposable for some other purpose under the new; or that some expense in fetching manure from distant places, that had used to be incurred, is saved. For, if the assertion 'that his crops have been as good as ever they were, and go nearly twice as far,' mean only that the dung when now expended is nearly twice as much in bulk or weight, and covers the surface of the field more thickly in the same proportion, the benefit is merely illusory, as the crop does not thus appear to be increased; but if the meaning is, 'that twice the surface is manured as effectually with the same quantity of dung'—then, indeed, we should say that the new plan may be fairly considered as entitled to the most serious consideration.

The same author, indeed, mentions an instance —cited in Dr. Thompson's system of Chemistry— of an experiment, from which it appears that the periods when putrescent manures begin to produce their effects, and the length of time during which they continue to operate, are proportioned to the degree of putrefaction under which they are applied. Two pieces, of the same kind of soil, were manured—the one with a mixture of dung and straw highly putrefied, the other with the same proportions of dung and straw newly mixed, and the straw almost fresh. It was then observed that, during the first year, the plants which grew on the putrefied dung produced a much better crop than the other; but the second year, the ground which had been manured with the fresh dung produced the best crop: the same result took place in the third year, after which both pieces seemed to be equally exhausted. This, however, only showing that the one was productive of the best crop in the first, and the other in the second year, proves nothing more than an equality of final effect upon the land: upon which it cannot escape reflection, that when the state of the soil does not require progressive improvement, the first crop is generally the main consideration with the farmer; he naturally, therefore, wishes to place it beyond the reach of those contingencies to which it might be exposed by any deficiency of effective manure.

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*Mr. Walker, of Mellendean, who rents about 2500 acres of arable land, has found by the experience of thirty years, that a small quantity of rotten dung is sufficient for a crop of turnips—and that all the succeeding crops, in the common rotation, are also generally good; but he could never raise a full crop with long fresh dung, which, from its openness, tends to admit drought, instead of affording moisture and nutriment to the roots, while they are young and tender. He is, therefore, at considerable expense in carrying out, turning, and re-turning his dunghills, so as to have the dung in a putrid state when laid upon the land in the month of June. After all he is every year obliged so to manure a part of his turnip land with fresh dung, *and whenever that is laid on, the crop is invariably much inferior.—Husbandry of Scotland, vol. i. p.* 161.

*Treatise on Soils and Manures. Anon, p. 145.

A knowledge of chemical principles, indeed, leads to the inference, that dung ought to be used in a recent state; and it has been thence assumed, 'that any disappointment which, in practice, may have attended the adoption of that inference, will be found to have arisen, not from a defect in the theory, but from a want of due observation of circumstances in its application.* But whatever may be found in the writings of scientific agriculturists in favor of unfermented manure, the experience of practical men may, in most cases, excuse a doubt of its expediency.†

Regarding the *application of straw*, which the Professor thinks 'should be ploughed into the soil in a fresh state, and that, in order to facilitate its mixture with the earth, it might be chopped small with a machine,' we deem it almost unnecessary to add anything more to the observations we have already made, except the record of an experiment made upon dry wheat-straw, which was regularly laid in the hollows of drills, and potato-sets placed over it. The straw and sets were then covered with earth, yet very few of the potatoes ever appeared above ground, and these only towards the end of autumn. When the ground was ploughed up, the straw seemed to have undergone no change, nor did it impart any sensible benefit to subsequent crops.‡ Had the same straw, however, been previously subjected to only a moderate degree of fermentation, there can be no doubt that its effects would have been very different; for, in most soils, potatoes thrive in dung which abounds in litter that has been very slightly fermented. Thus, if a quantity of straw be steeped for some days in water, till it become soft and pliant, and be then buried two or three inches under the surface of the ground, plants grown over it will assume a deep verdure; their growth will be vigorous, and this luxuriance will be continued until no traces of the straw are left. Sir Humphrey may therefore be right in saying that, 'though this unfermented straw would produce less effect at first, yet its influence would be more lasting;' to which we shall only add that, however the land may be thus finally benefited, the immediate object of the farmer is generally *a prompt return.*

In fine, although coinciding in the opinion that the decomposition of putrescent manure may be—and is very generally—carried too far, and that its value is materially lessened by an excess of putrefactive fermentation, yet experience proves that, to a certain extent, it is absolutely requisite, though its positive effects upon vegetation are still so doubtful that the degree can only be ascertained by observation. The main agents of the process are water, heat, and air. If a dung-heap be much wetted, the operation proceeds very slowly; but when only moisture is retained sufficient to condense it, then it presently heats, and the fermentation proceeds so violently that, if not checked, a large portion of its bulk seems to escape by evaporation; though, if this be only the effect of the condensation of its materials, and if its weight be not also reduced, the residue may perhaps be thus rendered more nutritive. The opposite result may, however, be the fact; for it may be observed that, if a quantity of farm-yard dung be removed from a dunghill and turned loosely to the air, though it may be cool at first, yet, if moderately wet, it will soon generate heat; it will smoke violently, and emit a very pungent effluvium: from which it may be conjectured, that the nutritive properties of the manure would have been better preserved if it had not been exposed to further fermentation. Care should therefore be taken to preserve these exhalations from being dissipated, and it will be probably found that the object will be sufficiently attained if the vegetative power of seed-weeds be destroyed, and the fibres of the straw be reduced to the state of spit-dung.

Some fermentation will necessarily be ever going on in the dung-heap; but there is little danger of its being carried too far if the ingredients which it contains be well and properly mixed. If horse-dung alone be employed, it will soon proceed to an excess, occasioned by its own internal heat, that will deprive it of every fertilizing quality; but if mixed with the cooler dung of horned cattle, that risk will be in a great measure avoided. Then, if the dry contents of the covered sheds be also added to the mass of wet litter in the straw-yard, the whole mixture will undoubtedly not ferment beyond the point best suited to render it immediately available. 'In a large dunghill, of such a mixture, the heat of the active fermentation subsides in it long before any of its useful parts are destroyed, and long before even all the water which it contains is evaporated out of it; for, on examination, the manure will be found to be quite short, and easily lifted with the fork or shovel; while, at the same time, it will be saturated with the richest black-colored juices, which appear to be the essential parts of urine deprived of their water.'* We, therefore, consider it as the opinion of a large majority of the most intelligent farmers, that dung should not be laid upon the land until it has undergone such a change as may be sufficient to destroy the seeds and insects which it may contain. This, however, cannot be effected except by a putrid fermentation, which, under common farm management, cannot be completed until the heap be decomposed and cool; for otherwise, the operations of cartage, spreading, and ploughing in

*Reports of Select Farms, in the Farmer's Series of the Library of Useful Knowledge: Kyle in Ayrshire, No. xi. p. 41.

†In the papers selected from the Correspondence of the Bath and West of England Society, there are queries proposed by the Board of Agriculture on several subjects connected with cultivation. The answer by one of their most distinguished members to that regarding manure, is as follows:—

'What are the effects of dung and other manures upon the taste, flavor, and wholesomeness of vegetables?'

'If the dung be completely rotten, the effects will be quickness of growth, succulence, crispness, and delicacy of flavor. I strongly suspect that the application of ill-digested manure to land is an evil productive of very great injury. Worms and grubs are multiplied thereby—the most noxious vapors are propagated; and, probably, the diseases in our grain crops may originate in this circumstance. I cannot believe that the delicate fibres of a root, making an effort to penetrate a clod of putrefying dung, can escape uninjured; and vegetable diseases, I presume, often commence at the root.'—Vol. ix. Art. xix. p. 235. 'I have known recent manure check vegetation.'—Ibid. p. 232.

‡Farmer's Magazine, vol. xvi. p. 485.

*Quarterly Journal of Agriculture, No. xix. p. 83.

the manure, while in a state of heat, would dissipate the gaseous matter, and thus occasion the loss of that in which its nutritive powers are partly supposed to consist.

Produce of straw and dung.

The *quantity of straw and haulm grown per acre* depends upon such a variety of circumstances touching soil and cultivation, season, and kind of crop, that it is quite impossible to form any precise calculation on the subject. Estimates have, however, been made of the average weight of different sorts produced by the various species of grain, from which a general idea of their gross amount may be formed. Although it is clear that nothing like accuracy can be expected on that point, yet it is in the power of every farmer to form a tolerably exact notion of the weight of all the straw and haulm actually grown upon his own land; and coupling this with the number of his live-stock and the nature of their food, he will probably be able to make out such a rough calculation of the *gross quantity of farm-yard manure* as may not be far from the truth. Such an account may indeed appear at first sight to be more curious than useful; but crops depend in a great measure on yard-dung, and their rotation must be regulated, on most soils, by its amount: it is therefore important to ascertain, as nearly as possible, the quantity on which a man who is dependent upon its production alone, without purchased manure, can rely, before he lays his plan for the ensuing year. The following are some of the estimates alluded to:—

31cwt.	or	3472lbs.	wheat	160st.	or	3520lbs.
25	"	3310	beans & peas	130	"	2860
25	"	2300	oats	130	"	2860
20	"	2240	barley	100	"	2200

Rye, about 3 loads of 36 trusses each, or 5[illegible]38lbs.

The yield of different years varies the proportion which all grain and pulse bear to the straw: but the average of wheat is about 12 bushels to the load, which, according to the practice in most parts of England, consists of 36 trusses of 36lbs. each, and weighs 11 cwt. 2qrs. 8lbs.; but, according to the above statement, the whole average of the kingdom is supposed to be about $1\frac{1}{4}$ tons per statute acre.*

It has, however, been calculated by Dr. Coventry, the Professor of Agriculture in the Unisity of Edinburgh, that arable land of a medium degree of fertility and management, is capable, in ordinary years, of producing, in round numbers, per imperial acre, about—

23 bushels of wheat,
36 do. of barley,
42 do. of oats;—

and that the average quantity of straw yielded by those crops will amount to 21 cwt. He then states that, supposing this dry straw to be moistened and rotted, it would thereby gain an addition to its weight equal to two-thirds, or between three-fourths and two-thirds of its gross weight—thus producing about three and a half tons of manure: and admitting that some corn is consumed in the feed of horses, as well as that the refuse of the grain, the chaff and light corn, besides the straw, go ultimately to the dung-heap, 'one cannot reckon the amount of the putrescent manure gained from an acre of such produce at more than four tons.' But, judging by the like proportion of moisture of different parcels produced by straw, pulse, hay, or herbage of any sort, it is likely that a full produce of turnips, potatoes or cabbages, would furnish even a considerably greater weight.'* By an experiment very carefully made by Mr. Dudgeon, of Prora, in East Lothian, it however appears that dry straw had only increased by absorption from 390 to 719 stone, during a period of seven months; which is materially at variance with the Doctor's estimate of the addition to its weight. It seems, however, from the statements of several eminent farmers, that one ton of straw when augmented in weight by the dung and urine of turnip-fed stock, will, if properly managed, produce about four tons of farm-yard manure;† but others, with more justice we think, are of opinion that such a quantity can only be produced when the common number of cattle on farms in the ordinary course of cultivation are also fed in the usual way—upon hay, clover, and corn, as well as turnips, besides being well littered with straw. Its weight and value will of course be affected by its state of preparation, as well as by the nature of the soil and its cultivation. Meadow land which produces one and three-quarter tons of hay per acre has been calculated to give six and two-fifths, or rather more than six tons of manure per acre,‡ and the fallow crops produce a large amount; the land, therefore, without assuming any extraordinary degree of fertility or management, should yield, upon an average, at least four tons of manure per acre; to which if be added the extraneous substances which may, with due care, be collected without expense from the roads, the ditches, the ponds, and from refuse of every kind about the house and premises, the acreable amount should be amply sufficient for a full supply of manure once during every course of the four-years system of husbandry.

Dr. Coventry has also given an estimate of the average quantity of manure that may be procured from different crops, on land that, in common years, and under good management, may be supposed capable of producing 28 bushels of wheat, and 42 bushels of barley or oats, per imperial acre.

	Tons.
By clover, grass or herbage, hay, &c., first year	6

*Sinclair's Code of Agriculture, 3d edit., p. 429; Survey of Middlesex, 2nd edit., pp. 220, 518.

*Quarterly Journal of Agriculture, vol. ii. p. 337.

†Sinclair's Code of Agriculture, 3d edit., pp. 215, 440; Scottish Husbandry, 2d edit., vol. i. p. 379, and *passim.* A Berwickshire farmer gives a single cart-load of turnips per day to eight or ten cattle in the straw-yard. He finds that, on an average of three years, from two and a half to three acres of straw will winter one of those oxen; and in this way each acre of straw will produce about four double cart-loads of rotten dung of from 30 to 35 cubic feet each.

‡ Quarterly Journal of Agriculture, vol. ii. p. 337.

By clover if mowed, second year	$5\frac{1}{2}$
By pulse-crops—as beans—part of the grain being fed by live-stock	$5\frac{1}{2}$
By pulse-crops, when the grain is sold	5
By white, or corn crops, as wheat, barley, &c., as an average of the whole	4

The manure is understood by him to be the common farm-yard sort, consisting of the dung and litter from the different offices, in a state only so far rotted as to be easily divisible by the dung-fork, and so dry as to have in it of moisture only about two-thirds, or perhaps a little more, of its whole weight, and to be capable of immediate application to the land.*

We fear, however, that, looking to the system of cultivation pursued on most farms, the quantity of manure produced falls far short of that amount. Much, indeed, depends upon its judicious management—for a good farmer will accumulate perhaps nearly twice as much dung as his more indolent and inattentive neighbor, and apply it in better condition to the land, though their opportunities are, in this respect, the same. No means should, therefore, be neglected to supply the deficiency; in which view, besides the extension of the soiling system, we should strongly recommend that corn crops should be cut as low as possible, so as to increase the bulk of straw. When the stubble is left high and ploughed in, it retards the operation, renders the land foul, and is, on some soils, injurious by rendering them too open. It is, indeed, in many places mown, and converted into walls for the comfort of the cattle. In Derbyshire a paring-plough is used, by which the roots of the corn and weeds are cut, and the stubble and other stuff is then carried home to be trodden into muck: but the produce does not pay the expense, and it has been found a more economical practice, when it can be carried into effect, to burn the stubble on the ground, by which insects and the seeds of weeds are destroyed. Even when raked up, it has been considered advisable to spread and burn it on the land, as it is thought to have a great effect in preventing the ravages of the fly on turnips.†

The following experiments on the *quantity of dung voided by cattle*—lately made under our own direction—will throw some further light on the subject.

The first was on a dragoon-horse, placed, at our request, by the Commandant of the Cavalry Depôt at Maidstone, in a separate box—on the 26th of January, 1833—and there kept, with one hour's exercise each day, during the following week, in which time the quantity of forage issued to him, and converted into dung, was as follows:—

Oats each day,		10lbs.	=	70lbs.
Hay,	"	12	=	84
Straw,	"	8	=	56

He drank, within the week, 27 gallons of water; and, during his time of exercise, the loss of dung is supposed to have been 4 lbs. daily, or 28 lbs.: in which period therefore—

The total forage consumed amounted to 210 lbs.
And the dung and litter produced was $327\frac{1}{2}$ lbs.

Thus—if the lost dung be added—yielding, with the addition of the moisture imparted to the litter by urine, an increase of two-thirds beyond the weight of the solid food.

The second—on the 28th of March, 1833—was on the food actually eaten by a large-sized Yorkshire milch cow, which was fed during four and twenty hours with the following provender—

81 lbs. of brewer's grains,
30 lbs. of raw potatoes,
15 lbs. of meadow hay.

The food thus amounted to 126 lbs. She drank two pailsful of water, and the urine was allowed to run off; but she had no straw or litter of any kind, and the weight of the solid dung, which was carefully swept up, amounted to 45 lbs.

The third was on the same cow, a week afterwards, but with a change of food, which was continued during some days, on the last of which she consumed within the four and twenty hours the following quantity:—

170 lbs. of raw potatoes,
28 lbs. of hay.

As in the former trial, no litter was allowed, and the urine was let off; but the solid dung amounted to 73 lbs.

Although not incidental to the subject in question, it may however be worthy of remark that, although the cow was in perfect health, yet, on this latter food, her milk actually fell off at the rate of very nearly two quarts per day.

When cattle are well littered and fully fed with turnips, it has been usually found that about twelve of them will yield a one-horse cart-load of dung within twenty-four hours; but that quantity will scarcely be produced by sixteen, or even eighteen, if kept only on straw, with a small allowance of turnips. It has also been calculated that an acre of very good turnips, with an adequate proportion of straw, will make upwards of 16 cart-loads of dung; but 10 may be considered a sufficiently large average for the generality of those crops. Thus, it may be presumed that two acres will be required to manure one.*

An account by Arthur Young states that the winter stock on his own farm in Hertfordshire consisted of six horses, four cows, and nine lean hogs, which consumed 16 loads of hay, with 29 loads of straw for litter, besides, no doubt, the usual quantity of oats to the working cattle. The cows and store swine ran loose in the yard, and had their straw given in cribs; the horse-stables and fat-hog sties were cleansed into the yard: in May, the whole of the dung was turned over and laid into heaps, and in June was carted away. The quan-

* General Report of Scotland, vol. ii. p. 521. We have omitted the Doctor's estimate of the dung produced by pasture, as being irrelevant.

†See the Surveys of Essex, vol. i. p. 325; Huntingdonshire, p. 128; Derbyshire, vol. ii. pp. 124, 131, 406. In a work published about a century ago, and ascribed to Lord Belhaven, it is asserted that the goodness of the East Lothian crops was attributable to the length of their stubbles. 'A good crop of corn makes a good stubble; and a good stubble is the equallest mucking that can be given.'—The Countryman's Rudiments, p. 23.

* Roxburgh Report, p. 134.

tity was 118 loads, each of 36 bushels.* The amount of manure which may be thus obtained is indeed so considerable, that forty-five oxen, littered, while fatting, with 20 wagon-loads of stubble, are said to have produced 600 tons of rotten dung: and so invariably has it been found that the value of the manure is in proportion to the nutriment contained in the food, that, on comparing the dung of cattle fed upon oil-cake with that from the common farm-yard, it was found that the effects of 12 loads of the former, when spread on an acre of land, considerably exceeded that of 21 loads of the latter.†

[To be continued.]

For the Farmers' Register.

EXPERIMENTS OF THE INJURY TO CORN CAUSED BY GATHERING THE FODDER.

Several publications in the Register have stated the increase of Indian corn, matured with the blades and tops. The common usage in this county, which I have followed, is, to gather the blades as soon as they begin to spot, and to cut the tops immediately upon securing the blades. About the first of September last, I stripped the blades from several rows in one of my corn-fields, leaving a row alternately undisturbed—and cut the tops about the 7th of the month, in like manner. As I designed to make a fair and satisfactory experiment, I suffered both blades and tops to be much withered before I took them from the stalks. The last of November I gathered the corn from the stripped and unstripped rows, when it was dry, and in good condition, and put it away in my barn in separate parcels, in the shucks, from both of which I husked out, the sixth of the present month, one hundred ears, without particular selection, and now subjoin their weight and measurement. I am sensible that this experiment will not precisely correspond with others which may be made. The result of such experiments will be influenced by the quality of the soil, the goodness of the crop, the manner of planting, and the maturity of the corn at the time the blades and tops are gathered. My experiment was made from a field planted four feet each way, which had an early, vigorous growth, unchecked by insect or drought, and which produced more than forty-five bushels to the acre. I made other different trials upon the parcels I have mentioned, both by weight and measurement, which I think unnecessary to state, as they all tended to the same result; but perhaps I ought not omit to mention, that the weight of the cobs of the unstripped corn was double the weight of the stripped, as it proves that subtracting the blades and tops dries up that part of the plant which immediately supplies aliment to the grain. To this cause I also attribute the perfection of the grain to the end of the cob of the unstripped corn, whilst that on the stripped had, for the most part, withered or perished.

	lbs.
One hundred ears of Indian corn matured with blades and tops—weight on cob.	54
Do. shelled,	46
Do. measurement, 26 quarts, 1 pint,	
100 ears of Indian corn stripped of blades and tops—weight on cob,	50
Do. shelled,	41
Do. measurement, 21 quarts.	

I have long desired to abandon gathering fodder; but it is hard to depart from common usage, especially, if the deviation has the appearance of negligence. The month of September is usually devoted by farmers to this work: the dews are then heavy, and highly injurious to laborers; it is the season for intermittent fevers, which I believe are often contracted in this employment. The month of September might be most usefully devoted to drawing out marl and other manures, and preparing fallows for wheat. When the wheat is sown and the corn gathered at full maturity, the corn-stalks with the blades and tops, afford some provender and excellent litter for cattle. Few farmers have such floating capital, as justify them in entering upon schemes of improvement without calculating the cost and probable result. The provender afforded by Indian corn cannot be abandoned, unless an equivalent be supplied. A farm divided into four or five fields, of forty acres each, and one of them annually in Indian corn, will not produce fodder, even if the land be in an improved state, beyond five hundred pounds to the acre—equal to ten tons. Four acres set in orchard-grass and clover, will, if marled and manured, at two cuttings yield ten tons of hay. A gentleman in an adjoining county, in whom I have entire confidence, assured me that from one acre, very highly improved, he gathered six tons in one year. I estimate the enclosing, marling, manuring, and setting in grass four acres, at one hundred dollars per acre, and the land thus diverted from the usual purposes of agriculture, at twenty-five dollars per acre, amounting in the whole to five hundred dollars. The capital thus invested, is not sunk, but is safe and sound, and the interest upon this sum, together with the cost of cutting and securing the hay, which I estimate at forty-five dollars, is the price to be paid annually for hay, in lieu of blades and tops. A field of forty acres of Indian corn which now yields, under the old system of gathering, forty bushels to the acre—equal to one thousand bushels, if my experiment, or that of others, be not entirely fallacious, will produce an additional fifth, amounting to one thousand nine hundred and thirty-three and a third bushels; thereby producing a gain of three hundred and thirty-three and a third bushels—equal, at fifty cents a bushel, to one hundred and sixty-six dollars and two-thirds, to which is to be added the value of the labor saved, and the grazing after the hay is secured, which is worth something. If a lot be once well set in orchard-grass and occasionally dressed with manure from the stable, where the grass is fed it will remain in a state of undiminished production for many years—in this I feel confidence, from my own observation.

I have one pit of blue marl in which I have found "gunpowder marl." It exhibits no lime by

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* Papers of the Bath and West of England Society, vol. iii. p. 3.

†By another trial it appears that sixty cows with and four horses, when tied up, ate 50 tons of hay, and had 20 acres of straw for litter, with which they made 200 loads of dung, in rotten order for the land; but the weight of neither the straw nor the dung is stated. —Complete Grazier, 5th edit., p. 160.

he test of acids. There is no green sand—but it has many shining particles, and a sulphureous smell. It retains the impression of large shells and some sharks' teeth, in a state of perfect soundness, have been found. I have supposed that the hardness of the teeth have resisted the agents which decomposed the shells. On this subject Mr. Newton's essay in the Register is highly instructive. I have long thought that this pit contained properties, fertilizing beyond lime. It does not by the test of acids exhibit lime equal to another pit; yet it has been uniformly quicker in its action, and greater in its product. I am pleased that specimens of the gunpowder marl found in Virginia, have been sent Professor Rogers. Agriculture stands indebted to him for much useful information. I left a specimen, taken from my pit, with our Professor Ducatel. If the properties, suggested by Mr. Newton, shall be found in them, in addition to my own personal benefit, I shall feel gratified that this source of improvement is common to Virginia and Maryland.

As this article contains little more than a statement of facts, I have subjoined my name in attestation of their accuracy.

WM. CARMICHAEL.

Wye, Queen Anne Co., Md., Jan. 27th, 1836.

IS THE REARING OF RACE HORSES A GAINFUL OR LOSING BUSINESS IN VIRGINIA?

To the Editor of the Farmers' Register.

For some time past you cannot have failed to observe a vast increase of attention in Virginia and elsewhere to the breeding of fine horses, especially, such as were designed for the turf. Whatever may be my opinions on the subject of the morality of such sports as the turf and its ordinary accompaniments offer, I have no disposition to obtrude them either upon you, or your readers. But as a lover of my state, as a friend to agriculture, and a patron of all which I suppose can benefit our permanent interests, I propose to present a few thoughts on the subject of raising fine horses. If the business is *never* profitable, let none engage in it. If it is *ever* profitable, let us ascertain to what extent—and never exceed the limit thus furnished. Are not too many now engaged in it, to allow any very important advantage to accrue to the majority of those concerned? Admitting the business to be ever so good, is it not over-done? Why, sir, even the poor man, who owns but one animal of the horse-kind, is taking his mare from the plough, when he ought to be making bread for his family; and paying sixty dollars a year, for the chance of having her in foal by a high-blooded horse.

In order to arrive at correct conclusions on the subject, let the following or similar estimates be made, and remembered. If they be inaccurate, let them be corrected. In preparing this article, there has been no intentional excess in any one estimate.

The average cost, by purchase, of a fine brood mare, bought on reasonable terms, may be assumed to be $400. Suppose her to be put to the horse when she is four years old, and she ought not to be put sooner: suppose her to live until she is sixteen years old, which is a liberal estimate; and suppose her to bring a live and sound colt, two years out of three, so that in her life-time she foals eight sound colts; then for each colt she brings you—must put down one-eighth of her original cost, which is $50.

The interest on money, invested in a brood mare until she brings you eight foals, at $50 each, would be for the first year, at the end of which she brings a colt, $24. Allowing her, according to the foregoing estimate, to have but two good colts in three years; you must lose the interest on $350 for two years, before it will be reduced to $300, which interest is $42. The interest for the fourth year is $18—for the fifth and sixth years, it is $30—for the seventh year it is $12—for the eighth and ninth years, it is $15—for the tenth year it is $6—and for the eleventh and twelfth years, it is $6. Being an average of interest on the purchase money of the dam, before it is restored by eight colts, at $50 each—(being two colts for every three years—of a life sixteen years long, and twelve of these years the mare being old enough to bring a colt,) of more than $19 for each colt—the whole amount of interest on the purchase money of the dam, being $153. So that the average cost of a dam to each colt, may be put down at $69.

The average cost of keeping a brood mare one year, including expenses of groom, &c., &c., &c. cannot be less than $75 per annum. But as you have to keep her twelve years so as to get eight colts, you must charge to the estimated cost of each colt eighteen months—keeping of the dam which is rather more than $102. The money expended in keeping the dam for eighteen months before each colt is dropped, will not be returned for four years: at which time the colt will be in market, the interest on which money amounts to $24,50 cents, (say $24.) So that you do pay, for each good colt dropped, in expenses for the dam alone $195.

The average price of the best blooded stallions for the season, is at least $60. The range is from $50 to $100. This money is payable at the end of the season, at least six months before the colt is dropped. But as the mare, even if put to the horse, does not bring more than three colts for every four times she is put; therefore, you must add to each of every three colts dropped, the third of the price of the season when there was no colt, which is $20; which added to the $60 makes $80. Now as this money is paid at the end of each season, and the colts brought into market at four years old, you lose the interest on $80, for four years and six months; which interest amounts to $21.60, (say 21.) So that each good colt dropped, cost you for the sire alone $101, which sum added to the cost of the dam, gives a total for each good colt dropped, of $296.

Suppose the mare safely delivered of a fine healthy colt, it costs you on an average for the two first years' keeping $100—and for the two succeeding years, without training $150—in all, for rearing a colt until it is four years old, $250. The interest or the cost of keeping the colt, being the first year $40—the second $60—the third $75—will amount to $18,60, (say $18;) which added to precise cost of keeping a colt is $268. So that each untrained colt of four years old, for expenses of dam, sire and raising, has cost a total of $564.

But on an average you mus tdeduct ten per cent.

from the sum of live and sound colts foaled, for death, or material injury, received before the colt is four years old, so that the colt is a total loss—not to say expense. Now suppose the death or injury to occur on an average at two years of age, when the colt has cost you $414; you must add to each of the remaining nine, one-ninth of that sum which is $46. So that on an average, each of your colts raised, and sound and untrained at four years old, costs you a total of $610.

Of all the fine colts raised, not more than one-third are ever trained; leaving you two-thirds of all your fine colts, which have cost you each, $610. Of these two-thirds of untrained colts, one-half are mares; we will suppose them all fine—and to bring as brood-mares each $400. The other half of the untrained colts being geldings sell at a liberal estimate on an average of $200. So that of three colts each costing $610, and the three costing an aggregate of $1830, you sell two for an aggregate of $600, leaving you one colt for training at the handsome sum of $1230. Now add the cost of training this colt, which is never less than $100; and each trained colt raised by you, costs you $1,330.

Twenty colts thus raised and trained, cost an aggregate of $26,600. Of these twenty it is certain, that ten will not bring more than an average of $500, each. Deduct the aggregate value of these ten, from the aggregate cost of the twenty; and, it leaves you ten colts, costing an aggregate of $21,600. Of these ten, it is certainly a fair estimate, that six will not bring you more than $1000 each; so that you have four first rate colts, trained and sound at four years old, costing you an aggregate of $15,600; or each colt costing you $3,900.

These prices seem to stand on sure arithmetical grounds. If any of the charges have been made too high, the mistake is open to correction. But it can scarcely happen that any possible mistakes, and their exposure, can exhibit a result of any thing but *loss*, on a general average, to the breeders of racing horses. But these expenses are not all. There are expenses of another kind to be added, which though more *conjectural*, and therefore more liable to be incorrectly estimated, are not the less certain to be met with in greater or less amount—and generally in a very large amount. I will now present an estimate of a supposed average of this additional charge—and if any reader objects to its justice, he may even reject it entirely. The case of loss is sufficiently strong without this additional charge—which is for the general injury caused to a man's farming business and income, by the directing his care and attention, to this seductive and engrossing pursuit.

Suppose a man to have $20,000 invested in land, negroes, plantation stock, &c., &c., &c. and that besides this investment, he keeps five first rate brood mares: what will be the effect of this latter fact, on the availableness of the first investment of $20,000? Will it not well nigh neutralize it? Certainly it will diminish its profitableness one-half. Now estimating the profitableness of such investment to be six per cent. per annum, (which it ought to be,) and calculating the interest on one-half of the investment, it gives us $600 per annum. Now according to the foregoing estimates, with five brood mares, it will require twenty-two years to secure to the proprietor the four first rate trained colts four years old; and during eighteen years he loses the interest on $10,000 annually; which, in twenty-two years, will amount to $13,200; which sum divided equally among the four fine colts, and added to their previous cost, makes each one to have cost the proprietor $7,200. Thus, his four horses cost him a total of $28,800.

It is proper to add, that if the person attempting to raise fine horses be a poor man, and therefore, cannot lose the interest on $10,000 annually, it only makes the case the worse; for being poor, his own close and personal attention to his private affairs is a matter of great importance—and being poor, he is destitute of the means to bring his colts favorably into market, so that the utmost he is likely to do, is to raise saddle-horses at $200 each, and, brood mares at $400; while they actually cost him, each $610; that is, he sells at an average of $300—what cost him an average of $610. What a prospect for making money! A man sells his colts at less than half what they cost. Or if he has as many of them trained, as is commonly done: then after twenty-two years toil, he has raised and sold, or has on hand, four fine horses; each of which cost him $7,200. What he will actually get for each of his fine horses is a question I cannot answer. But suppose he gets for three of them, $5000 each—and for the fourth, $10,000—being a total of $25,000 still, he loses in money $3,800. But one in sixty of all the fine colts raised to be four years old, does not sell for $10,000: and three more out of every sixty, do not sell for $5,000 each. On the contrary, not one in three hundred sells for $10,000; and not one in one hundred for $5000. Besides, those horses, which even bring these prices, seldom bring it at four years old. They have to be travelled through the country, and money risked upon their speed, and great expense incurred, before they will command this sum. It is very seldom that the gentleman raising the horse, gets the high prices just named. It is the racer who has paid for him at most $1000 or $1500, who afterwards sells for these high prices. It is true that the owner of the colt sometimes is, or becomes the racer; but if his first lessons on the turf are with his own colts, he is apt to find it a very losing business.

Thus, Mr. Editor, I have stated the result of my inquiry into this matter. Are not the foregoing estimates correct? One of Virginia's most honored sons, who has furnished the data on, which they are founded—says they are within bounds. He himself has made the experiment on a large scale, and under every advantage; and he has arrived at the full and firm conclusion, that a more losing business is not done. But if the estimates be incorrect, let any gentleman show, wherein: and prove the business profitable, if he can. But if these estimates be any thing like the truth, let us abide their decision: and when we think of raising fine horses, let us remember the lessons taught by these or similar estimates.

It is pleasant to know that light is *beginning* to break in on the public mind, on this subject; and that a few gentlemen of foresight and prudence, who, for a time were led off by the delusion, have sold out, or propose to sell out—and thus the work will pass into the hands of poor "Jim, who, has not looked at the other side." Yet is there not on the whole any diminution, but rather an increase of the entire business done in this line.

GULLEY.

CALCAREOUS MANURES. OBJECTIONS TO THE LIMITATION OF THE TERM "CALCAREOUS EARTH" TO CARBONATE OF LIME.

To the Editor of the Farmers' Register.

Cambridge, (Dorchester,)
E. S. Md., Jan. 27, 1835.

* * * * * *

I have, for very many years, entertained the conviction of the want of calcareous matter throughout the whole of our peninsula with which I am acquainted; yet the almost impossibility of obtaining it in any of its combinations, in the section (Dorchester) in which my destinies have placed me, has diminished, mortifyingly, the advantages that might have resulted from that conviction. Ten years ago, I constructed an auger with a long shank, and fixed with a moveable crank to work at any point of its length: and I have bored on my lands, indefatigably, in quest of marl, to no purpose. A year ago Professor Ducatel assisted me in full confidence—but in vain. The few shells which my neighborhood afforded me have made my only resource—enough only to increase my regrets at the privation. I have finally made a large contract for oyster-shells in Baltimore, to be transported ninety miles—a few thousand bushels of which were delivered last fall, which led me to make further research into the operation and uses of calcareous manures. At this critical moment I had the satisfaction to receive the kind favor of your Essay on the subject, and I say in truth, I know not, whether to appreciate the more the untiring zeal, or the discriminative judgement, evinced in that production. Your propositions exhibit a philosophic view, founded, in my opinion, upon facts—which time, observation, and reflection, may extend and improve, but will never controvert.

Though extremely unfashionable, yet the doctrine of uncombined acids, vegetable as well as mineral, ready formed in the earth, I have always maintained, and I believe, on good authority, as well as reason; and the presence of either the one or the other class would bring calcareous manures, within your *rationale* of its operation. Upon this subject, the celebrated Duhamel, who is known where science has reached, has expressed himself eighty years ago, in these words—"if the clay is of a cold, acid nature, the marl destroys that acidity, and keeps the clay warm, &c. &c.—*Duhamel's Practical Treatise of Husbandry*, published 1762, p. 23."*

Dr. Darwin in his "Phitologia" says, "where clay abounds with vitriolic acid, it is anti-septic;" and he recommends lime and ashes, as a corrective.

The source of carbonic, acetous, oxalic, and many other acids may be found, as every one knows, in the continual growth and decay of vegetable substances. Some, in the *products* of their decomposition, by the fermentative process, others are mere *educts*, being ready formed in the plant: it is reasonable to believe that these results will, under favorable circumstances, be deposited in the matrix from which their elements had been derived, and where they had grown and perished, with which, too, they would become mechanically mixed, and so intimately, as to be largely retained: and more especially, if undisturbed by agricultural operations—which accords with the fact stated by you, "that rest increases acidity in the soil:" the effect thus produced becomes a new cause, furnishing the proximate principles, peculiarly required by the plants which yielded them; hence a *cumulative series* of cause and effect, indefinitely extended, and constantly in operation. A greater degree of "fixity" is consequently not essential for their continued presence in the earth. The materials for the generation of many of the mineral acids are equally copious. By lessening the aptitude of the soil for the production of those species of vegetables, by the neutralization of their acids, the cause and effect are removed, *pro rata*—and its constitution becomes finally adapted, exclusively, to other species of vegetation. Moreover, the *evaporability* of the first named, the carbonic acid, is not so considerable as some suppose: its specific gravity being as 15 to 10 of atmospheric air, it may be copiously held by the cold soil—though, this I mention, incidentally, and not in reference to your theory, with which the question of the presence of this acid does not interfere.

Mr. Grisenthwaite says, "the carbonic and acetic are the only two acids likely to be generated by any spontaneous decomposition of animal or vegetable bodies, and neither of them have any "fixity," when exposed to the air." The *acetous* acid is more fixed in its character than the *acetic*, holding more carbon—and is not so likely to escape; and it is in that shape, possibly, that this variety of vegetable acid may usually exist in the earth; and hence the force of Mr. Grisenthwaite's remark is at least diminished in its purpose. But, for reasons before given, acids whether generated by the spontaneous decomposition of bodies, or by the secretion and assimilation of organic life, may be fixed in the soil, under very possible, and indeed, very usual circumstances, durably enough to operate much good or evil, as their respective characters may incline them; and yet they may not possess enough of that property of "fixity" to bear transportation and exposure in the laboratory of the analyst. The oxalic and other acids come under the same remarks. As to the "humic" acid, its actual detection in the soil rests, at least upon highly respectable authority.

* Our correspondent gives to this work, more credit than it deserves, in supposing it to be Duhamel's. His name, though standing most conspicuously on the title page, and with the intention of passing for the author's, is a publisher's cheat, which will be manifest to a careful examination of the title page itself, with a glance at the contents of the volume. It is a compilation, and a part consists of experiments reported by Duhamel—but not the passage referred to—which indeed, is worth nothing as authority even if it happened to contain a truth. In speaking of *acidity* in the soil, the compiler uses the term ignorantly, without any precise meaning, or the least knowledge of the chemical nature of soils, or calcareous manures—of which enough evidence is furnished in other passages soon after. See quotations from the work, and remarks thereon, in Note G, of the Appendix to the *Essay on Calcareous Manures*, p. 82, —Ed. Farm. Reg.

These views which are just, allow ample scope to the agency of calcareous manures, and lead essentially to the use of them, upon general principles—upon ancient authority—and upon the principles assumed by you in your essay under review; and more especially, in reference to those properties, whereby they exert a chemical action of neutralizing acids: and, of combining putrescent manures with the soil; which otherwise under chemical laws, would be resisted.

Your definition of "calcareous earth," I must take exception to—it is too limited—and leads you occasionally into apparent solecisms, which are not corrected by the reader, until he turns to, or, reflects on your peculiar definition. You define "calcareous earth" to be a combination of lime with carbonic acid. You ascribe the sterility of soils to their being destitute of this earth. You recommend calcareous earth, as essential to restore and preserve them in a state of fertility: and you admit, that many of the most fertile and valuable soils are destitute of calcareous earth. But you explain that these contain lime, though with a vegetable acid. Had you used the term "calcareous manures" with a latitude of definition, embracing all manures with a calcareous base, in all their various combinations, chemical and mechanical, it would have been more systematic—perhaps more scientific and familiar language. And you might then, too, allowing each their respective grades of utility, have made your preferences of the various combinations of calcareous bodies; and with your reasons of discrimination, growing out of your clear and excellent theory and without any of those apparent contradictions in terms, which now in a few intances occur. Experience has taught, that all the calcareous bodies, in all their varied modifications, possess properties subservient to the purposes of vegetation —though the carbonate, for its easy decomposition, may perhaps justly occupy the highest order.

In truth, my exception upon a point of nomenclature is not worth maintaining, and I have made it, solely, because I believe that innovation of terms, or, of the meanings of terms generally, tend to perplex and retard the progress of scientific improvement.

You will please to accept my zeal for the art and science of agriculture, as an apology for these few remarks, and an acknowledgement of the services which, by your unwearied diligence, you are rendering to the agricultural interest of the country—and with it, to the author of these remarks.

When I commenced this letter, I had no idea of extending it beyond the subjects of the first paragraph—but I have lugged in as foreign matters as the amendments of a modern fortification bill—and so you may dispose of it as you think proper.

JOSEPH E. MUSE.

To the Editor of the Farmers' Register.

Cambridge, E. S. Md., January 29, 1836.

The near approach of the mail-hour hurried the latter portion of my last communication to you, and rendered me, I am conscious, less explicit in my exception to your term and definition of "calcareous earth," than I might have been; and I beg leave to add the following postscript, explanatory of my views.

You define calcareous earth, to mean "lime with carbonic acid." This definition I designed to suggest, is not consistent with the present state of geological science, and technical nomenclature; and therefore, is rather embarrassing to the reader.

Since the discoveries of Sir Humphrey Davy, with which you are fully acquainted, and the truth of which discoveries are, I believe universally acknowledged, earths are known to be "metallic oxides." To wit: "aluminous earth" is "alumina" or the "oxide of aluminum;" "silicious," is "silica," or the "oxide of silicum;" "calcareous earth" is "lime," or the oxide of calcium." These earths combined with any of the acids, form salts with earthy bases; or "earthy salts." Dr. Ure classes "lime," (not carbonate of lime) among the primitive earths. Dr. Webster, Professor in Harvard University, in a work, compiled from Bronde, Henry, Berzelius, Thompson and others, says: "of the primary earths, only four are usually met with: to wit: silica, alumina, magnesia, and lime, (not carbonate of lime.) hence it would seem, that "lime" and not "lime with carbonic acid" is "calcareous earth."

The term then used by you, does not appear technically correct. It is true, that defined as it is by you, the meaning is conveyed, and perhaps as well—yet, it is not so familiar, or systematic, as the nomenclature of modern science, founded upon modern discoveries—which have been adopted as unquestionable truths.

The facility and frequency of the union of lime with carbonic acid, will not sanction the innovation, any more than they would justify the term "aluminous earth," to imply the union of alumina with sulphuric acid, with which it is so often found united by the hand of nature. The adoption of it, therefore leads to apparent contradictions: which though removeable by reference to your definition, is a little embarrassing.

You will excuse, in your liberality, the harshness of my cursory review of your inestimable essay; which should have a prominent place in every agriculturist's library. And again, except my thanks for the presentation of it; and the assurance of the high regard of

JOSEPH E. MUSE.

Our correspondent unnecessarily apologizes for his strictures. They would be welcome, from any such source, even though far more extensive and severe, and unaccompanied by such complimentary and gratifying expressions, as we are indebted for above. We only desire that the doctrines of the *Essay on Calcareous Manures* may be considered as public property—without reference to the author—to be strictly scrutinized, and admitted to be true and important, or condemned as false and worthless, according to a correct appreciation of their value.

The objections urged by Dr. Muse to the application and limitation of the term "calcareous earth" to *carbonate of lime*, are sound and weighty—and they were considered, and fully appreciated, before that definition was adopted. The only excuse for this application—and which still seems to us sufficient—is that any other would be attended with far greater objections--whether the term was limited to the pure chemical earth *lime* alone, or was made to embrace every combination of lime whatever. Either of these applications would have been far more regular in appearance, and more suited to scientific arrangement.

The defence for the course adopted as to this term, was given in a note in the Appendix to the *Essay;* which, as it has not been seen by many who will read these letters, will be copied here. The passage presents the views which then induced the decision, and which still remain unchanged.

"The definition of "calcareous earth," which confines that term to the carbonate of lime, is certainly liable to objections, but less so than any other mode of arrangement. It may at first seem absurd to consider as one of the three principal earths which compose soils, *one* only of the many combinations of lime, rather than either pure lime alone, or lime in all its combinations. One or the other of these significations is adopted by the highest authorities, when the calcareous ingredients of soils are described--and in either sense, the use of this term is more conformable with scientific arrangement, than mine. Yet much inconvenience is caused by thus applying the term calcareous earth. If applied to *lime*, it is to a substance which is never found existing naturally, and which will always be considered by most persons as the product of the artificial process of calcination, and as having no more part in the composition of natural soils, than the manures obtained from oil-cake, or pounded bones. It is equally improper to include under the same general term all the combinations of lime with the fifty or sixty various acids. Two of these, the sulphate, and phosphate of lime, are known as valuable manures: but they exist naturally in soils in such minute quantities, and so rarely, as not to deserve to be considered as important ingredients. A subsequent part of this essay will show why the oxalate of lime is also supposed to be highly valuable as a manure, and far more abundant. Many other salts of lime are known to chemists: but their several qualities, as affecting soils, are entirely unknown—and their quantities are too small, and their presence too rare, to require consideration. If all the numerous different combinations of lime, having perhaps as many various and unknown properties, had not been excluded by my definition of calcareous earth, continual exceptions would have been necessary, to avoid stating what was not meant. The *carbonate of lime*, to which I have confined that term, though only one of many existing combinations, yet in quantity and in importance, as an ingredient of soils, as well as a part of the known portion of the globe, very far exceeds all the others.

"But even if calcareous earth, as defined and limited, is admitted to be the substance which it is proper to consider as one of the three earths of agriculture, still there are objections to its name, which I would gladly avoid. However strictly defined, many readers will attach to terms such meanings as they had previously understood: and the word calcareous has been so loosely, and so differently applied in common language, and in agriculture, that much confusion may attend its use. Any thing "partaking of the nature of lime" is "calcareous," according to Walker's Dictionary: Lord Kames limits the term to *pure lime**—Davy† and Sinclair,‡ include under it pure lime and all its combinations—and Kirwan,‖ Rozier,§ and Young,¶ whose example I have followed, confine the name calcareous earth to the carbonate of lime. Nor can any other term be substituted without producing other difficulties. *Carbonate of lime* would be precise, and it means exactly the same chemical substance: but there are insuperable objections to the frequent use of chemical names in a work addressed to ordinary readers. Chalk, or shells, or mild lime, (or what had been quicklime, but which from exposure to the air, has again become carbonated,) all these are the same chemical substance—but none of these names would serve, because each would be supposed to mean such certain form or appearance of calcareous earth, as they usually express. If I could hope to revive an obsolete term, and with some modification establish its use for this purpose, I would call this earth *calx*—and from it derive *calxing*, to signify the application of calcareous earth, in any form, as manure. A general and definite term for this operation is much wanting. Liming, marling, applying drawn ashes, or the rubbish of old buildings, chalk, or limestone gravel--all these operations are in part, and some of them entirely, that manuring that I would thus call *calxing*. But because their names are different, so are their effects generally considered—not only in those respects where differences really exist, but in those where they are precisely alike."

*Gentleman Farmer, page 214, (2d Edin. Ed.)
†Agr. Chem. page 223, (Phil. Ed. of 1821.)
‡Code of Agriculture, page 134, (Hartford Ed. 1818.)
‖Kirwan on Manures, Chap. 1.
§"Terre"—Cours Complet d'Agriculture Pratique.
¶Young's Essay on Manures, Chap. 3.

EXTRACTS FROM THE REPORT OF THE GEOLOGICAL RECONNOISSANCE OF THE STATE OF VIRGINIA, MADE UNDER THE APPOINTMENT OF THE BOARD OF PUBLIC WORKS.

By William B Rogers, Professor of Natural Philosophy in the University of Virginia.

[Continued from p. 634 Vol. III.]

Of the Green Sand, Sulphate of Iron, Sulphur, and other matters associated with the marl beds.

Green Sand.—As already intimated, this substance is frequently found disseminated in the marl, and also in the overlying stratum of clay or sand. From the remarkable effects of comparatively small quantities of this material when applied to land, there can be no doubt that many of the marls of lower Virginia owe some of their value to its presence. Supposing only as much as 10 per cent. of this substance in a marl, and this is far below the amount which I have ascertained to exist in many localities, 100 loads of marl would correspond to ten of the green sand, an amount which in New Jersey has often been found productive of striking benefit. Several of the most efficient marls which I have examined, were more remarkable for the large proportion of this substance contained in them than for their richness in calcareous matter. In many marl pits which I have visited, the impressions of the pick and spade were streaked with green marks, which upon inspection were found to result from the bruised granules of this matter. In such cases, there can be no doubt of the existence in the marl of an amount of green sand capable of affording material aid to the growing vegetable. In the layer immediately above the marl also, it sometimes exists in considerable quantity—and hence instead of rejecting this overlying mass, in many cases it would be decidedly better to carry it out upon the land along with the calcareous matter. The experience of many farmers has already shown the propriety of this plan, and some even entertain the opinion that this upper layer, where the green sand abounds, is quite as beneficial as the marl itself. Further observations respecting the green sand will be given in treating of the Eocene marls, of which it constitutes a very important ingredient.

Sulphate of Iron and Sulphur.—In some parts of the Miocene district, there occur beds of clay more or less sandy, and usually of a dark color, containing these substances in a minute but still appreciable quantity. Such matter, there is reason to believe would not in general prove directly beneficial to the soil. The former has been thought positively detrimental to vegetation, and certainly when applied in considerable quantity, this is its effect. What agency it might exert in a more diluted state, and mingled with other matter, we are without the means of determining. Probably under such circumstances it might operate as a stimulant; and thus contribute to the growth. The same doubts are also applicable to the other substance above named. Yet in some well authenticated cases, the action of these *copperas and sulphur* clays has been found strikingly beneficial. In these instances, however, it would seem that much if not all the benefit was produced by the effectual protection which even minute quantities of these substances, especially the latter, afford against the attacks of insects. In a cotton field in which all the alternate rows were lightly sprinkled with earth of this description, the plants so treated grew up vigorous and healthy, while the others became sickly and were nearly devoured by insects. Much careful observation is required to determine the kind and mode of influence which these substances exert, and it would be premature, in our present ignorance of the matter, to assert any convictions on the subject. The presence of the former of these ingredients, if not recognized by the copperas flavor, will be readily discovered by steeping the earth in water, decanting the clear liquid, boiling it down to a small volume, and then adding tincture of galls or prussiate of potash. A black or brown color with the former, or a blue one with the latter, would indicate its presence. The experiment, however, should be made in a glass or china vessel. The sulphur becomes manifest to the smell when the clay is heated, and even at ordinary temperatures its peculiar odor may often be perceived.

Eocene marl district.

As already indicated, the extent and boundaries of this interesting portion of eastern Virginia are as yet in a great degree matters of conjecture. The discovery of an Eocene deposite in the state first announced by me about eighteen months ago, in a communication to the Farmers' Register, has been followed up by a minute personal examination of some parts of the district in which it occurs, more especially on the James river and Pamunkey. Its existence on the Rappahannock and Potomac has also been ascertained, and specimens have been obtained from a number of intermediate points. With regard to the region south of the James River, though facts have been procured which show conclusively that the deposite continues to the southern boundaries of the state, time has not admitted of such an investigation as would be necessary in defining its extent. A regularly continuing line of observations on the Pamunkey river, commencing below the point at which the deposite appears above the water's edge, and extending up the river to the junction of the North and South Anna, where it terminates, has served to develope the arrangement and composition of the strata, and to determine the width of this portion of the formation. An inspection of the most important Eocene localities on the James River has also contributed many interesting and valuable facts, while the Rappahannock and Potomac, its western limits, have been determined with as much accuracy as could be attained by transient observations directed only to a few localities.

Wherever observed, the arrangement of the beds of the Eocene and the minerals and fossils contained in them, have been found strikingly alike, and hence the description of any transverse line of the formation may be regarded as conveying a just representation of its character throughout. At the same time, however, it is by no means to be assumed, that in all localities the same arrangment or composition of the strata must necessarily exist; for within a short distance in observations already made, considerable diversities have been observed to exist. But there can be little doubt that the general order of the strata already remarked, as well as the character of the fossils which they contain, will present much uniformity whenever the formation may be discovered within the limits of the state.

The existence of Miocene strata over the Eocene, has been referred to under a former head, and some account of this more recent overlying deposite within the district of which we are now treating, may, with propriety, be prefixed to the description of the Eocene itself.

Of the Miocene which overlies the Eocene.

Westward of the limits of the Miocene previously defined, the general level of the country continues gradually to rise. A surface more generally undulating, and strewed with water-worn fragments of stone, sometimes of considerable size, marks our approach to the region of hills and rocks, whence these memorials of the destructive forces of a former period have been derived. The superficial strata in the western portion of this district is generally a coarse sand or gravel, often containing large masses of rounded sandstone and other rocks, of which the parent strata are generally to be found at no remote distance to the northwest. An inspection of these pebbles is sufficient to show, that in many, if not nearly all cases, they are derived from the grits and sandstones with which the bituminous coal of eastern Virginia is associated, while from the similar nature of the sand and gravel in which they are embedded, we are entitled to conclude, that at least in part, they also refer themselves to the same region for their origin. In the hills at and below Richmond, and in many other places, these beds of gravel have considerable depth, and present a structure at once curious and instructive. A series of strata at these places, in some of which the pebbles are disposed in horizontal lines; in others in lines oblique, but still generally parallel, inclining downwards to various points in the different layers, give striking evidence of the agency of those diluvial and oceanic currents, of which geologists have discovered so many memorials in other regions, and may serve when minutely studied, to throw much light on the physical changes to which this portion of the continent must formerly have been subjected.

Beneath these beds of gravel, in many places strata of clay occur; but whether referrable to the same epoch of deposition, cannot as yet be clearly ascertained. Many beds of very argillaceous clay, suited for the potter and brickmaker, and occasional layers of a pure beautiful yellow ochre, may be placed in this portion of the series.

Other strata of clay and sand of a peculiar character present themselves in many localities beneath the superficial beds. These contain a record of their origin legible to the geologist, in the impressions of shells and Zoophytes with which they are generally filled. On comparing these casts, which in most cases can be easily recognized even in their more delicate markings, with the fossils of our Miocene marl strata, their identity is established, and thus the strata in question at once take their places in the series of Miocene Tertiary deposites. In many parts of Hanover, King William, Henrico, and other counties in its range, these beds of clay are found, usually characterized by a dark greenish gray or brown color, a sulphureous odor, and an astringent taste. On Governor's Hill in Richmond, a stratum of the same kind is exposed; and at this spot, the fossil impressions and other characters above noticed, may be distinctly seen. Like the clays and sands formerly described as associated with the Miocene, these contain sulphate of iron (or copperas,) sulphate of alumina (or alum,) and sulphur in an uncombined condition. So large a proportion of these substances is sometimes present, as to render the water obtained from the strata in which they exist, absolutely unfit for use.

It is to the existence of these materials in the strata, that we are to look for the cause of the disappearance of the calcareous matter, in the form of shells, which they once evidently contained. Either of the sulphates above named would exert a rapid decomposing action on the carbonate of lime, of which shells principally consist. The sulphuric acid of the sulphate combining with the lime of the carbonate, thus converting it into gypsum, while the carbonic acid would, in great part, escape in the form of gas. That the gypsum is not now discovered in these beds, is an obvious result of the comparative solubility of that substance in water; its continuance in the strata being only possible where a heavy covering of clay excluded the percolating liquid.

Useless, if not injurious, as these clays are now believed to be when applied to land, there is reason to think that they are capable, by a little application of chemical knowledge, of being rendered truly valuable as an auxiliary manure. The gypsum into which their enclosed shells were once converted, would doubtless have imparted to them a high agricultural value. Can we not replace, if not all, some portion of this fertilizing material, by mingling the clay with the more pulverulent shell marls occasionally found in its vicinity? That this mixture would result in the conversion of a portion of the shelly matter into gypsum, there can be no doubt; and where the clay was originally rich in copperas and alum, the amount of the gypsum thus compounded would be proportionally great. Experiments on this subject are well worthy of being tried, not only with the clays here mentioned, but with those of a similar nature, which, as already remarked, occur in the more eastern portion of the Tertiary districts of the state.

Before the *amount* of *gypsum* to be anticipated from such a treatment of these materials can be estimated, a chemical determination of the proportion of sulphates of iron and alumina must be had, and to this point future analysis might be usefully directed.

But though much of the Miocene marl in this district has been exposed to the destructive chemical agencies above explained, much also is found retaining its carbonate of lime in undiminished quantity.

On the lower levels on their river banks, it appears seldom to have escaped the dissolving and decomposing action of the sulphates, while in the highlands it may usually be found containing its calcareous matter nearly as when first deposited. In King William, Hanover, Prince George, &c., beds are found in the highlands, at some distance from the rivers. The fossils they contain are identical with those of the marl beds farther east, and the materials with which they are intermixed present no peculiarity important to be remarked. Specimens of this Miocene from Hanover, King William and Prince George, exhibit a good per centage of the carbonate of lime, and as might be expected, the strata from which they were taken are usefully resorted to by the neighboring farmers.

As would be inferred from remarks previously made, the general level at which this marl occurs, is higher than that of the Eocene, and here the promise is held out that this latter, even in the highlands, would be exposed by excavations carried to some depth beneath the lower limits of the former.

In examining the Eocene deposite on the Pamunkey and James Rivers, the interesting geological fact was observed of an *actual superposition* of the Miocene upon it; and on the Pamunkey, the precise point was determined at which the Eocene first makes its appearance above the water-line, being there overlaid by a heavy bed of the more recent deposite. This occurs at Northbury, and directly opposite at the plantation of doctor Charles Braxton.

Of the Eocene or lower Tertiary marl.

The descriptions and facts which will be comprised under this head, will principally refer to the localities on the Pamunkey and James Rivers, to which especial observation has been directed. At the same time that their value, as applying to the Eocene district generally, may be regarded as being sufficiently established by general geological analogies, as well as such observations upon other portions of the region, as the present early stage of the inquiries has allowed me an opportunity of making. No region of eastern Virginia holds out more certain promise of reward to future investigation, and none will reap from the research more lasting and important benefits.

Description of the Eocene strata of the Pamunkey.

Rising above the water-line at Northbury, the upper surface of the deposite is seen ascending with a very gentle slope, as it extends higher up the river, until at Newcastle it attains an elevation of about 25 feet above medium tide. Beyond this point, with slight undulations in its outline, it continues with but little general deviation of height from the water-line to near its termination at the junction of the North and South Anna, where it dips or thins out until lost immediately on the verge of the coarse sandstone, which there, for the first time, makes its appearance in massy form. The deposite appears on both sides of the river wherever the flats do not intervene, and at the base of the second level, corresponding in position to its place in the river cliffs in the same vicinity.

On the south side of the river, the deposite has been particularly examined, at Northbury, Hampstead, Retreat, Washington Basset's, Walker Tomlin's, Mrs. Ruffin's, Mr. Roane's and Mr. Wickhams's, where it terminates. Specimens have been collected from other localities, either on the river or at the base of the second level: on the north side, at Chericoke, captain Hill's, Mr Nixon's, Piping Tree, Newcastle, Dr. Braxton's and Mr. Fox's. Specimens also from various other points on, and remote from the river, have been procured, and thus a somewhat minute acquaintance with this portion of the Eocene tract has been attained. Towards the southern boundary of the deposite, the following arrangement of strata occurs, commencing at the top.

1st. A stratum of greenish yellow earth containing no shells, but numerous traces or casts of them, plainly showing that shells were at one time embedded in the mass. Sulphate of lime or gypsum occurs in crystals sometimes of considerable size, interspersed throughout this stratum, which is principally made up of coarse silicious sand, blended with granules of green sand or silicate of iron. The thickness of this bed is variable ; at Chericoke and Hampstead it is about two feet; at Retreat from four to five.

2d. Beneath this lies a layer of dark greenish blue or brown earth, which when dried, generally falls to pieces, and is discovered to consist mainly of coarse silicious sand, and green sand, together with shells generally in a broken condition. The shelly matter is sometimes entirely wanting, though occasionally it composes a large portion of the mass. At Hampstead, the calcareous ingredient exists in large proportion and in a finely divided state. Frequently, one or more thin layers of the oyster shell peculiar to the lower Tertiary region occurs in the body of this stratum; a fact remarkably exemplified at Piping Tree, and for nearly a mile further down the river, where the layer of shells forms a hard rockey shelf laid bare at low tide, and presenting large and perfect specimens of the fossil oyster, in the midst of the greenish stratum just described.

At Chericoke the stratum rises to about four feet above the water, and as ascertained by digging, descends to seven feet below the river shore.

Higher up the stream, these strata attain a greater elevation, and subjacent beds not apparent at either of the points above described, come gradually into view. In these localities we usually find,

1st. A layer of dark grayish green or grayish brown color, containing multitudes of shells, generally in a perfect state; the fossil oyster shell already referred to abounding chiefly in the upper part of the stratum. Beneath this, but frequently separated by no distinct line of demarkation, we find,

2d. A layer of darker hue, containing less shelly matter, and the shells chiefly of the smaller kinds; and

3d. A stratum of the same appearance, in which no calcareous matter can be discovered.

All these strata contain a large portion of the green sand. In the upper and lighter colored beds, the granules of this substance are very obvious to inspection, resembling in size and color the grains of gunpowder, and giving when bruised a bright green stain. In the lower beds they are more minute, and being intimately mingled with the other materials present, are not readily recognized, excepting by the general greenish character of the mass. These beds also contain a great deal of Mica in fine sparkling scales. Of the depth of these strata below the level of the river nothing definite is known, no extensive excavations having yet been made. At Mr. Wickham's they are found to rest upon a layer of large pebbles, but this basis is perhaps not co-extensive with the deposite lower down the river.

When the upper bounding surface of the Eocene is even and uniform, it is always marked by a *thin layer of black pebbles*, upon which there usually rests a bed of olive colored earth, or of friable white clay—and in some cases, both these strata, the olive colored being next the Eocene.

This olive earth is of a fine texture, containing but little gritty sand. Here and there a shark's tooth in a decomposed condition, or the impression of a shell may be discerned. The white stratum abounds in casts, but never presents the shells themselves. It shows a light trace of gypsum, but in neither of these beds does there exist any carbonate of lime. From the character of the organic impressions they contain, they clearly refer themselves to the Miocene formation.

In some places on the river, particularly where the upper bed of the Eocene contains gypsum, as at a point a little below Piping Tree, a thin layer of ferruginous rock abounding in casts occurs immediately in contact with the Eocene; this also is to be placed among the strata of the Miocene.

A more distinct conception of the order and extent of the strata of both the Tertiary divisions, as they occur at different points along the river, will be obtained from the following summaries derived from observation.

On the north bank of the river in a cliff about half a mile below Piping Tree, the beds taken in a descending order are,

Miocene.	1. White friable sandy clay, containing fossil impressions,	10 feet.
	2. White sandy marl with broken shells,	$\frac{1}{2}$
	3. Ferruginous stratum abounding in casts, and occasionally containing the shells themselves,	$\frac{1}{2}$
	4. Thin band of black pebbles.	

Eocene.—	5. Dark green sand stratum—no shells,	4
	6. Rockey shelf of cemented shells of the saddle-shaped oyster,	½
	7. Dark green sand strata with small shells,	2
		17½

The highest Miocene bed is not exposed at this point, but occurs a little farther up the river in the character of a dark blue clay with fossil impressions, on which there rests a thin layer of ochreous clay, as brilliant in its tints as the finest chrome yellow. This ochre is of the most impalpable texture when dried, and would be found very valuable in coloring.

At Mr. Washington Basset's, about 4½ miles higher up the river, the bank is precipitous, and presents the following series of strata:

Miocene.—	Superficial gravel,	5 or 6 feet.
	Thin layer of friable sandy clay with casts,	½
	Olive-colored earth with shark's teeth, and a few casts of Miocene shells,	7
	Thin line of black pebbles.	
Eocene.—	Dark greenish brown stratum, containing a large proportion of green sand, and in some parts abounding in shells. The upper portion consists of a rocky mass of cemented shell, chiefly the saddle-oyster,	20

At Walker Tomlin's, on the south side of the river, immediately below Newcastle, the beds are,

Miocene.—	Friable white clay and sand with casts of shells,	2
Eocene.—	Olive earth with pebbles at bottom,	6
	A dark bluish green clay, containing a great deal of green sand, capped by rock as at the former locality,	25

At Newcastle and William H. Roane's and Mrs. Ruffin's estates, a similar series of beds occurs, rising still higher above the level of the stream. About 1½ miles above Newcastle, the upper surface of the Eocene marl has an elevation above the river of more than thirty feet. The lower stratum consists of the bluish green clay before mentioned, containing only a few of the more delicate shells, and richly abounding in green sand; the upper of a gray calcareous marl, thickly speckled with granules of this substance. Over the whole is a layer of the white friable material, with Miocene impressions.

The upper surface of the Eocene usually presents an unbroken line, though at some places, as at Mr. Fox's above Newcastle, this is not the case. The bed here consists of a light-colored sand and clay, speckled with the green sand, and containing vast numbers of the Eocene oyster. Its outline presents numerous cavities and eminences, exactly resembling these which occur in the Miocene deposite nearer to the seaboard. A narrow layer of common sand deeply tinged by mixture with green sand, lies immediately upon this irregular surface, and the whole is covered with a bed of gravel and sand, with diagonal lines of stratification, indicating the agency of currents at the time of its deposition.

At Mr. William Wickham's, the overlying stratum consists of bands of ferruginous gravel and sand, containing round concretions, like Geodes, generally filled with sand. Thin seams of iron ore run along this stratum a few feet above the fossiliferous beds. These latter, in some places, present a level outline, and are then always covered by a layer of sandy clay containing much green sand. On the other hand, where the outline is undulating and irregular, a stratum of gravel rests immediately in contact with the bed of marl. The size of the gravel thus deposited, as well as the scooped surface of the bed on which it reposes, indicating the operation of powerful currents after the deposition of the strata of Eocene, presents an explanation of the absence in these places of the upper bed of this formation, remarked as present in those spots where there are no such indications of the action of destructive forces. The matrix of the fossils is sometimes an olive-colored clay, sometimes a grayish green sand and clay, and sometimes a bluish black clay, containing a large proportion of the granules of green sand. The depth of the marl is 15 feet.

Eocene strata of the James River.

The beds of Eocene on the James River first make their appearance on its southern shore near Coggin's Point, and thence continue, except when interrupted by the river flats, to a small distance above City Point, making a distance following the flexures of the shores of about ten miles. On the opposite side they have been found at Berkeley and other points, but as yet this portion of the deposite has been but little examined.

At Coggin's Point, Tarbay and Evergreen, the cliffs have a height varying from 30 to 40 feet. The Miocene marl, which in some places is seen overlying the Eocene, abounds in scallops and other shells which make it easily recognized. Beneath this and usually separated from it by a thin line of black pebbles, like those occurring on the Pamunkey, there occurs a stratum of a greenish red and yellow aspect, containing much green sand and gypsum; the latter partly disseminated in small grains, and partly grouped in large and massive crystals. The under stratum, rich in green sand and containing a few shells in a friable condition, extends to some depth beneath the level of the river, and appears to rest upon a bed of clay of a lead color, containing crystals of gypsum. At Evergreen a stratum of pure white clay rests upon the upper layer of Eocene, containing, embedded in its lower surface, large groups of crystals, and seems to occupy the place of the black pebbles before mentioned. The whole thickness of the Eocene deposite at this point appears to be about twenty feet. Below as well as above this place, its height declines until no portion of it is any longer visible above the water edge.

Eocene Deposite of the Potomac, Rappahannock, and Mattapony, &c.

Although the shores of these rivers have as yet been but little examined with a view to the structure and arrangement of the various strata they exhibit, enough has been observed to prove that they are no less rich in the Eocene marl than the other districts which have been described. On Potomac creek, and for a great distance below its mouth, the green sand strata may be seen running along the base of the cliff; and from specimens examined, there can be no doubt that the character of the deposite is similar to that of the Eocene of the James River and Pamunkey. On the Rappahannock, for a considerable distance below Port Royal, the very same appearance is presented; and the green sand obtained from some of these localities is in every respect like that from the points already noticed. In some places on the Mattapony, the occurrence of the green sand stratum has been ascertained, while in others the beds containing this substance are replaced by beds of clay, which, though geologically of the same (or Eocene) formation, are yet less likely to prove interesting to the agriculture of the vicinity. Minute inquiries throughout all this district, and throughout the corresponding region south of the James River, are alone capable of developing the extent and value of this deposite. Even a great deal yet remains to be done in investigating localities on the James and Pamunkey Rivers, the northern shore of the latter being so far almost unexplored, and the precise character and value of some of the beds in localities examined being but imperfectly ascertained.

Of the several beds composing the Eocene formation.

In treating of the accompanying Miocene in the beginning of this section of the report, our descriptions have been confined chiefly to those beds which occur remote from the rivers upon the highlands, and no mention has been made either of the white friable sand or olive colored clay already frequently noticed in describing the overlying strata on the Pamunkey.

The first of these, though once the repository of shells and other fossils, is now entirely destitute of carbonate of lime. A small quantity of gypsum in a minutely divided state seems to be its only ingredient of any value, and the amount of this present in the specimens I have examined is much too inconsiderable to give the material any agricultural importance.

The olive earth, which is frequently an extensive layer, has also lost all the calcareous matter which it once contained; but a further examination, chemical and geological, of this material, will be required before its nature can be exactly determined, or the possible applications of which it may admit can be ascertained.

The upper bed of the Eocene, characterized in most of the localities by the gypsum which it contains, is worthy of especial consideration on account of this valuable ingredient. In specimens from the James River, from five to eight per cent. of this substance has been found in a divided state, at the same time that a considerable additional quantity in a massive form exists in various parts of the same stratum.

On the Pamunkey this stratum is not so thick, and is perhaps less abundant in the sulphate of lime. The lower beds, in some cases containing a marked proportion of shelly matter, and in others having almost none, are more especially distinguished by the larger proportion of another and even more important ingredient, to wit, the green sand. Both on the James River and Pamunkey, their richness in this material gives them an agricultural value which perhaps no proportion of calcareous matter by itself, however great, would be able to impart. The illustrations of its beneficial effects, and the general observations upon its employment as a manure or marl, which will hereafter be presented, will, I think, manifest the justice of this opinion, and give a sound confidence to those who are disposed to make trial of its powers.

Extent and commodious position of the Eocene on the rivers.

One of the most interesting facts presented in the foregoing description of the Eocene on the Pamunkey and James Rivers, is the great depth and extent of those strata, which, from the nature of their contents, may be applied to profitable use in agriculture. Beds of such materials, preserving an average thickness of twenty feet, extend along the banks of the Pamunkey with occasional interruptions for more than twenty miles.

Their position on the river shore makes them of most convenient access, and gives additional facilities to the conveyance of the fertilizing materials they furnish to various distant points, while from the peculiar character of the strata themselves, they are almost exempt from the usual destructive agencies of the freshets, being of a texture to withstand, with scarcely any loss, the most violent assaults of the sweeping currents by which the banks of the river are so often overflowed. To this cause we are to ascribe the steep declivity of the shores in many narrow parts of the river, where the abrading action of the water, instead of rapidly carrying off the materials of these strata, has merely served to wear them into smooth and almost perpendicular precipices rising immediately from the margin of the stream.

Existence of the Eocene beneath the highlands, and throughout the whole breadth of the state.

The general position and direction of the Eocene beds suggest another view of great practical importance to this and the neighboring districts of the states. I allude to the probable, perhaps I may say certain, continuation of these strata over a wide area, on a level corresponding to the general depth at which they are found upon the rivers. In confirmation of this view it may be remarked, that since the publication of a communication on this subject in the Farmers Register, the existence of a similar deposite throughout an extensive district of Maryland, lying in the general direction of our Eocene formation, has been brought to light, and there is reason for believing that within the borders of North Carolina, near to the Virginia line, the same strata are displayed in the banks of several of the streams. In the belief then that all the extensive band of country, stretching in a meridianal direction entirely across the state, rests upon strata of this description, we are led to regard it as furnishing an immense addition to the resources of the state, and as holding out to our enterprising farmers situated within its limits, a new motive to persevering and active research. Let it not be supposed, however, that wherever the Eocene occurs within our state, it will be found to present the same materials in the composition of its strata, as have been found in the localities already examined. Much diversity in this respect may, and probably does exist. On the Mattapony, as already stated, the green sand is frequently replaced by beds of clay of a dark lead color; while on the Potomac, Rappahannock, Pamunkey and James, variable but generally large proportions of the green sand occur, and the probability is, that future inquiries will develope similar diversities in the materials of the beds in other yet unexplored portions of the district. Constancy in the character of the embedded fossils is all that is necessary to a geological identity of the formations, and this constancy may exist at the same time that there is a considerable diversity in the materials in which they are enclosed. It is almost certain, however, that throughout a large portion of the region in question, extensive and valuable beds containing the green sand do exist, and that even in the highlands they might be reached by excavations descending not very far beneath the lower limit of the Miocene or ordinary marl.

On the value of the Eocene green sand marl in agriculture.

From the descriptions already given of the materials of the various beds of Eocene, it will be seen that many of them contain ingredients which have long been recognized as valuable when applied to land. The gypsum in some, and the carbonate of lime in others, will at once bespeak the favor and confidence of the agriculturist, and no observations, either as to their usefulness or mode of application, will be necessary to give them the importance they deserve. But the *characteristic and principal* ingredient of a large number of these beds, the *green sand*, possesses claims to our attention which are equally indisputable, though not so generally appreciated or understood. Experiments within our own state on this material, as furnished by the Eocene deposites, though few, and on a very limited scale, have been so far satisfactory. But as the marls containing this substance, which have been employed, have also in most cases contained a notable quantity of gypsum, or of calcareous matter, all the benefits which they have produced would most naturally and reasonably be ascribed to those ingredients, already known for their agency in ameliorating the land. On the Pamunkey the Eocene marl has long been in use, but chiefly those beds have been selected for the purpose of marling in which the largest proportion of calcareous matter was seen to exist. The lower layers, contaning little or no calcareous matter, have on that account, until lately, been rejected as useless, and sometimes when a bed of this description of considerable extent was found immediately overlying a more shelly stratum, much trouble and expense have been incurred in its removal, to make way for the excavation of the material beneath. Appealing to the experience of the farmers of New Jersey, by whom the green sand, in an almost unmixed condition, has long been applied for the purposes of a manure, its unrivalled efficacy, and the permanency of its ameliorating effects, are to be regarded as established and unquestionable facts. It is true, that at one time, owing to the ignorance of those who attempted to make use of it, and the application frequently of a spurious material resembling it in aspect, doubts of its value have been excited in the minds of some: but the extensive and uniform experience of the present enterprising farmers of that state, gives an unqualified testimony to the rapidity, the power, and the durability with which it acts.

A comparatively small dressing of this marl, often not exceeding ten or fifteen loads per acre, is uniformly attended with beneficial results, and this, whether the soil to which it is applied, be a clay, or a light steril sand. As an illustration of this fertilizing property of the green sand, I will subjoin the following statement quoted from the report of my brother, Professor Henry D. Rogers, on the geology of New Jersey, to which work I beg leave to refer, for ample and satisfactory details relating to the agricultural value of this substance, as well as for practical suggestions as to the most judicious modes in which it may be applied:

"When we behold a luxuriant harvest gathered from fields where the soil originally was nothing but sand, and find it all due to the use of a mineral sparsely disseminated in the sandy beach of the ocean, we must look with exulting admiration upon the benefits upon vegetation, conferred by a few scattered granules of this unique and peculiar substance. The small amount of green sand dispersed through the common sand, is able, as we behold, to effect immeasurable benefits in spite of a great predominance of the other material, which we are taught to regard as by itself so generally prejudicial to fertility. This ought to exhibit an encouraging picture to those districts not directly within the limits of the marl tract, where some of the strata possess the green substance in sensible proportion. It expands most materially the limits of the territory where marling may be introduced, and points to many beds as fertilizing, which otherwise would be deemed wholly inefficacious."

If such then be the effects of this material, even under circumstances where comparatively little advantage could have been anticipated, and if such moreover be the concurrent experience of those by whom it is daily and extensively employed, we are fully authorized in the belief, that in the Eocene beds of our own state, though in general less rich in the fertilizing ingredient than the secondary strata of New Jersey, the agriculture of eastern Virginia possesses a new and most valuable resource.

The chemical examination of these marls, with a view to precise results, being a matter requiring much time and labor, has as yet been carried on only to a small extent. But a thorough analysis of all the important varieties and an exact determination of the proportion of the various constituents, especially the green sand, or the calcareous matter in different localities, will be a work from which much practical good may be derived. By the light of such results alone, can the farmer be safely directed in applying it to the soil, or be properly guided in distinguishing, between a material which is spurious, and one which will be found salutary in its effects upon the land.

The following results are to be looked upon as approximate determinations, but will serve to illustrate the composition of several varieties of the marl:

Composition of green sand (Eocene) marls.

Doctor Corbin Braxton's,	Silica and alumina, &c.	50
	Carbonate of lime,	10
	Green sand,	38
	Gypsum,	2
Walker Tomlin's, lower stratum,	Silica and alumina,	60
	Carb. lime and gypsum, a trace,	
	Green sand,	40
Conrad Webb's,	Silica and alumina, &c.	30
	Carbonate of lime,	45
	Green sand,	25
Wm. H. Roane's, lower stratum,	Silica and alumina, &c.	50
	Carb. lime,	4
	Green sand,	46
	Gypsum,	2
Tarbay, lower stratum,	Silica, alumina, &c.	40
	Carb. lime,	3
	Green sand,	57
Do. upper stratum,	Gypseous earth containing from 6 to 10 per cent. of gypsum, and from 10 to 15 per cent. of green sand.	
Berkeley,	Silica, alumina, &c.	50
	Green sand,	50

Viewing these results generally, it is apparent, that while in some cases the efficacy of the marl would be ascribable in a degree to the calcareous carbonate or sulphate present in large proportion, in a great many others the green sand ought to be regarded as the chief, if not the only agent in the effects. A dressing of many of these marls to the extent usual in the application of the Miocene shell marl would scatter upon the soil a proportion of green sand, nearly as great as the average quota which is at present in use in New Jersey, and in the richer sorts, a much less proportion would be necessary than it is customary to apply where the shells abound.

We are struck, in considering the composition of these marls, with the happy variety of constitution which they exhibit, which, should there be any specific action of the respective ingredients on particular vegetables, which there is reason to believe is the case with one (the gypsum,) will the more completely adapt them to the variety of crops to which the farmer would wish them to be applied.

Some caution will be necessary in distinguishing the marls, containing a large proportion of green sand, from dark greenish clays and sands, which have sometimes been mistaken for them. These clays are always entirely destitute of fossils; they have an astringent or copperas flavor, and generally a strong sulphureous odor, though a slight smell of this kind is also often observed in the best marls. The occurrence of small shells sparsely distributed and in a decomposing state is very frequent in the good marls, though an almost total absence of shells is sometimes observed. Fine sparkling scales of Mica, (not gypsum, as supposed by some,) are generally present in considerable proportion, and have led those who speculated upon the action of the marl, to ascribe a large part of its efficacy to the supposed sulphate of lime or gypsum contained in it. To distinguish a marl of this kind from the dark blue Miocene marl, a slight attention to the embedded fossils will be sufficient. The saddle-shaped oyster, characteristic of the Eocene, and never found in the latter deposite, would at once determine the bed in which it is found to be of the former description—while the common scallop or clam, which is never seen in the Eocene, would indicate the Miocene character of the bed in which it lies.

In concluding what I have to say upon this important topic, I may be permitted to throw out the suggestion, that should the deposite of which I have been treating, be found as extensive in its range and as useful as a manure as here anticipated, the districts of the state contiguous to its western limits, as well as the region in which it occurs, might be expected to reap important benefits from its employment. Parts of Henrico and Hanover, and the lower part of Louisa, in which no marl exists, would be sufficiently contiguous to the Pamunkey deposite to avail themselves profitably of its use, and when the projected improvements in this region of the state shall present cheaper and readier means of transportation to the remote parts of the two latter counties, as well as to a portion of Goochland, it is not extravagant to hope that this material may be conveyed to those districts at such a cost as will render it a profitable as it would be an efficacious restorative to the exhausted and steril soils to which ameliorating applications have of necessity hitherto been denied.

To other parts of the state in a corresponding position, perhaps similar benefits might be dispensed, and thus most of that portion of the state beyond the reach of the limestone which ranges a little east of the South West Mountain, would in time be brought under the beneficent influence of the marls of the western limits of the Eocene formation.

ESTIMATE OF THE EXPENSES AND PROCEEDS OF A SILK GROWING ESTABLISHMENT.

[We are not competent to decide on the correctness of the following estimates, which however rest upon the respectable authority of the editor of the journal from which they are copied. But *this* we are prepared to maintain—that if such profits can be obtained near Albany, much greater would reward similar efforts in Virginia, on account of our greater cheapness of land, cheapness of the labor which young or infirm slaves, now an expense, might supply—and still more, on account of our longer summers, and milder winters.

Most of our readers possibly—and certainly most of the southern people who are not our readers—have no idea of the recent great and rapid extension of silk culture in the comparatively unfriendly northern states. Joint stock companies have been formed in almost every northern state, and large capitals invested, to carry on the entire business, from raising the mulberry trees, to the manufacture of the products of the worms. Either these people are mad, or we in Virginia, (especially of the middle region,) are in this respect, more than usually blind to our own interest.

Three new periodical journals are specially devoted to giving information on silk culture—and, three new treatises or manuals have been published, in addition to the several of somewhat older date. These facts, even more than the formation of joint stock companies and the investment of large capitals, prove that the public mind and interest are awakened—that knowledge is every where sought—and that truth must speedily be found, and generally acted upon. Would that such a spirit of inquiry existed in Virginia, either as to silk culture, or any thing else in which our true interests are concerned!]

From the Albany Silk Worm.

If there is a person in the world whose mind has not been warped and biased by the influence of hereditary prejudices and fashionable opinions; should that person be asked what human being is entitled to the highest veneration and esteem of his fellow beings, he would answer, the person who should devise the means to produce the greater quantity of the most palatable and nutritious food for his fellow creatures, at the least expense. Should he be farther asked, who is entitled to the next rank in public esteem? His answer would be; he, whose talents produces the same effect with respect to clothing. In other words, the most exalted rank belongs to the best agriculturist: and the next, to him, whose inventive genius has effected the greatest improvement in the quantity and quality of clothing at the least or a given price.

How enviable then must be the situation of that person, in whom is united both these titles, and whose employment is at the same time, as lucrative, as healthful, and as pleasing as it is useful to mankind.

Such an employment, with such advantages, and if well conducted, certainly and clearly entitled to such honor and respect, is now fairly presented to the people of the United States in the business of cultivating silk; and experiments have fairly shown that there is no deception in the offer, but that it may be entered into without any hazard or chance of failure. It embraces all the charms of rural husbandry, with as little of the hard labor, as is consistent with bodily health and vigor. Its agricultural department is calculated to furnish healthful and pleasant labor, and consequently, food to the indigent without servile degradation, and it furnishes the richest and most elegant clothing that man or woman ever put on; and when fairly introduced, under the advantages which this country offers, its price will never be beyond the reach of honest industry. And besides all this, the profits it will yield will be equal to, or greater than those of any other branch of agriculture or manufacture. Who then would not be a silk grower,—especially when the means of engaging in it, are within the reach of every one possessed of common mental and corporeal faculties, who has credit sufficient to hire an acre of ground, and that even of almost the poorest quality?

The ultimate success and perfect adaptation of the Chinese mulberry to every part of this country, are now established by reports of experiments which cannot be doubted, from every quarter. It is now ascertained beyond the need of farther investigation, that it is as hardy to endure the winter's frost as the white mulberry, or almost any other fruit tree. It is ascertained that the best ground to appropriate to it, is such sandy or gravelly and hilly ground as is of little value for most other uses,—that if seed cannot be obtained, it may be propagated equally well from cuttings, or pieces of twigs, or young branches, a few inches long, with one end stuck into the ground.

There is no industrious man in the United States, with a family and in health who cannot hire, if he cannot buy an acre of ground for a nursery; and having bought it, he can by exchanging work with some farmer, cause it, or a part of it to be ploughed. If he is unable to buy young Chinese mulberry trees, and cannot procure the seed, which may for a short time to come be rather difficult, he can easily, by a little energetic perseverance, procure two hundred cuttings, probably without paying any thing, or at most but very little. Let him commence with these, and at the lowest calculation, which is perhaps more than three quarters below the truth, they will produce him a thousand the second year and may be multiplied, from year to year, not only in the same, but in an increased ratio, as those first set out increase in size.

I will endeavor to show what may be effected by perseverance in a systematic plan, which is the only mode of proceeding with any certainty of success. I shall limit the calculation to seven years, which will be a fair beginning; after which, any one with the experience of that time, will be able to make calculations for the future. I shall set down each item in the calculation far below, and in some instances, three hundred per cent. below what fair experiments have shown, may be relied on.

As it is important, at the commencement to multiply the trees as fast as possible, I would advise to begin with about an acre of mellow, rich, sandy loam, which, though not so good for the ultimate production of silk, is more conducive to the rapid growth of the young trees before transplanting, and therefore, best for the nursery. In this nursery, I would set the seedlings, cuttings, or other young trees as near together as they can have room to grow, the first year.

The first year, 200 cuttings, set in the spring, will afford leaves sufficient to feed about 500 worms. This number would be of no profitable use in yielding silk; but it will be well to keep them, in order to form some acquaintance with them, and to provide eggs for the next year.

The moths produced by the 500 worms, will probably be half females, and will produce about 100,000 eggs; about 15,000 of which will be wanted for the next season. Suppose 50,000 of them should be sold at $12\frac{1}{2}$ cents, which is one half their present price, the account for this year may stand thus.

Rent for acre, for nursery - - -	$5
200 cuttings, say, - - - - -	2
Trouble of collecting, setting, &c. - -	2
Feeding 500 worms, - - - - -	2
	$11
50,000 eggs sold, at $12\frac{1}{2}$ cts. per 1000,	$6 25
Net expense out first year,	$4 75

Second Year.

This year also, but little or no profit can be expected. Allowing only five cuttings or layers from each tree, which is probably not more than one-fourth of what may be produced, there will be 200 trees of last year, and one thousand propagated this year. These will afford leaves sufficient for 15,000 worms, which besides producing eggs for next year, would yield perhaps a little over six pounds of silks, which at $5 per pound, will bring $30.

The expenses and proceeds of this year may be estimated thus.

Rent of nursery, - - - - - -	$5
Propagating by cuttings, or layers 1000 trees, - - - - - - -	6
Feeding 15,000 worms, - - - -	10
Reeling 6 lbs. silk, - - - -	4 50
	$25 50
Six pounds silk at $5 per pound, -	30 00
Net gain second year, -	$4 50

Third Year.

This year also will afford but small profit. All the increase of the trees may still be retained in the nursery. From each of those set the spring before, ten at least may be taken.

For the spring of the third year, there will be 200 trees two years old, and 1000 of one year old. From each of the first, may be propagated ten, and five from each of the others, making of this year's propagation 7000; in the whole 8200. If from each of the first trees, two pounds of leaves are taken, and one pound from each of the next, and 1000 pounds from the 7000 young plants, making in all 1900 pounds of leaves, these together will feed 50,000 worms, which will make twenty pounds of silk.

Statement for the third year.

Rent, - - - - - - - -	$5
Setting 7000 trees, - - - - -	21
Feeding and care of 50,000 worms, -	25
Reeling 20 pounds silk, - - - -	15
	$66
20 pounds silk at $5 per pound, -	$100
Net gain third year, -	$34

Fourth Year.

Proceeding in the same ratio for four years yet to come, allowing each tree set the year before, by cuttings or layers, to produce five, and each over that age, ten; which is infinitely short of what can be effected, then the number of trees for the fourth year will be 55,200, the fifth year 372,200, the sixth year 2,500,200, and the seventh year 15,872,200.

But as these last numbers outstrip all practical calculations within the bounds of reason, we will therefore go back to the beginning of the fourth year, which commences with 8,200 trees.

As this number will extend beyond the convenient limits of the nursery, of course it will be necessary to begin transplanting the trees to the place of their final destination. To effect this, I would advise to hire a piece of ground on a permanent lease, say twenty acres, and more if can be done conveniently, with the privilege of purchasing in three years.

I would prepare a part of this field, and transplant the 1200 trees of one and two years old. These I would set in rows eight feet and six inches apart, and the trees in the row, a little short of twenty inches, or ten trees in a rod, by which arrangement an acre will contain 3,200 trees. The whole field ought to be well fenced, or at any rate, the trees protected from every kind of depredation. The trees three years old may be calculated to yield three pounds of leaves each; those of two years one and a half pounds, and those of one year half a pound; in all 4,600 pounds without those set this year. These will feed 120,000 worms, which will yield fifty pounds of silk, which, at $5 per pound will amount to $250.

The expenses and avails this year may be set down thus.

Rent of nursery, - - - - -	$5
Rent of field, 20 acres, at $2 per acre,	40
Transplanting 1200 trees, preparing ground, &c. - - - - -	12
Attendance of worms and reeling, 50 pounds silk, - - - - -	100
	$157
50 pounds of silk, at $5 per pound, -	$250
Net gain fourth year, -	$93

Fifth Year.

The fifth year there will be 7000 trees two years old, and of course, ready for transplanting, which, with the 1200, already transplanted, making 8200, will occupy a little more than two and a half acres. These, with those one year old, will produce leaves enough to feed something over a million of worms, from which may be calculated on 416 pounds of silk.

Rent of nursery and field, - -	$42 50
Transplanting 7000 trees, - -	35
Feeding and care of 1,000,000 worms,	250
Reeling 416 pounds silk, - - -	312
	$639 50
416 lbs. silk at $5 per pound -	$2080
Net proceeds fifth year,	$1441 50

Sixth Year.

It will be perceived that as at the ratio at which we proceeded thus far in propagating, there will be this year untransplanted 47,000 trees of one year's growth, and 317,000 set this year; in all 364,000. These could not have room to stand in the original acre of nursery; I shall therefore suppose that the cultivator has, this year, either enriched and prepared a part of the twenty acres in order to enlarge the nursery, or has procured a sufficient quantity of suitable ground elsewhere, in which case the yet unoccupied portion of the twenty acres may be considered an equivalent, and the rent therefore, need not come into the account.

The sixth year will commence by transplanting the 47,000 trees two years old this spring, which with those transplanted before, will make 55,200, leaving space in the twenty acres for 8,800 more. There will then be for this year's feeding 200 trees of five year's; 1,000 of four year's, 7000 of three years and 47,000 of two years old. These will produce at least 60,000 pounds of leaves, which, with what may be gathered from 223,000 of one year old will amount to 100,000 pounds, which will feed, at a reduced calculation 2,500,000 worms, which number will make 1041 pounds of silk, worth $5205.

Estimate for this year.

Rent, - - - - - - -	$42 50
Transplanting 47,000 trees, - -	235
Feeding and care of 2,500,000 worms,	300
Reeling 1041 pounds silk, - -	520 50
Interest of cocoonery supposed to have been built last year, - - -	210
	$1308
1041 pounds silk at $5 per pound,	$5205
Net gain sixth year,	$3897

Seventh Year.

At the season of commencing this spring, the silk made the year before will have been sold, and after paying all expenses of the season will have left a net gain of above $3000; and as there will be 317,000 trees of two years old, if one-half of them are sold at two cents each, (the purchaser being at the expense of removing them,) which would now readily command six or eight times that price, they will amount to $3,170. By these means, there will be sufficient funds on hand to pay for the twenty acres of land, which at $30 per acre will amount to $600, and $3000 for a cocoonery, which I shall suppose to have been built on credit the year before, together with $210 interest; still leaving a balance of perhaps over $2000. I shall also suppose that in the course of the fifth season the cultivator has made a purchase of two hundred acres of land, which if the business has been well conducted thus far can easily be done on a credit, to pay by instalments of $1000 each, beginning after two years, and which at $30 per acre, will require six instalments. If this is done he will now be able from the remaining avails of last season to pay the first instalment with the interest due.

Table exhibiting at one view, according to the foregoing statement the number of trees set, the total number of trees, quantity of leaves, number of worms fed, number of pounds of silk and amount each year for seven successive years.

Years.	Trees set.	Total No. trees.	Pounds of leaves.	No. worms fed.	Pounds of silk.	Amount.
1st	200	200				
2d	1000	1200	340	15,000	6	30
3d	7000	8200	1900	50,000	20	100
4th	47,000	552,000	4600	12,000	50	250
5th	317,000	372,200	36,000	1,000,000	416	2080
6th	552,000	765,700	100,000	2,500,000	1041	5202
7th		755,700	595,000	16,536,000	6886	34,430

I have in this table not only estimated every item at the lowest rate, but omitted all fractions.

There is nothing visionary in this calculation. There is not an item in it which has not been outdone in practice, and nothing in it but what any practiced grower of silk knows can be realized. But as the two or three first years produce but little profit, many adventurers in the business who cannot look at the future through the medium of arithmetic will be apt to feel discouraged and abandon it. There are also many poor but industrious people who might commence the business, and not only acquire competence but wealth in a few years, but who are deterred from the undertaking by supposing that some considerable capital is necessary. It has been my principal object, in giving this statement, to show that no more capital is necessary than can be obtained by any person of common honesty and industry. Should the hints and outlines I have given prove the means of redeeming one deserving family from the cold embraces of cheerless poverty I shall feel amply rewarded.

For the Farmers' Register.

BUHR STONE—IRON ORE—CLAY FOR BRICKS—AND CHARCOAL.

It is somewhat unpleasant to come very often before the public, unless I had matters of great importance to communicate. I have, however, in previous communications, neglected to mention the existence of some mineral substances, in our region, which, perhaps, ought to be made known. By regarding appearances too much, we may sometimes fail to be useful.

There is, in this region, and in several places, quite convenient to the Appomattox, a great quantity of buhr stone, which I consider very good. Whether the use of native buhr, in the formation of mill-stones, would be an important acquisition, I am unable to decide; as I know nothing of the cost of that which is imported. I have understood that the late Edward Dillon, Esq. of this county, sent a boat load of buhr stone from his land on the Appomattox, to a Mr. Moutre of Richmond, about twenty years ago, with a view of having it tried in mill-stones. Both of these gentlemen dying about the same time, no return was made of the experiment. If you wish it I can easily send you a sample of the stone.

What is called bog-iron-ore is very common in this part of the country. I have also seen, from the land of Col. Charles Woodson, about nine miles above Farmville, some very fine specimens of vein iron-ore. Should coal ever be found in large quantities, in this vicinity, these ores may be valuable.

There is also a great deal of clay in this section, pronounced by one of the most skilful and intelligent bricklayers I ever knew, to be fully equal to, and exactly alike that, of which such superior bricks are manufactured in Baltimore.

I have been much interested by the accounts in the Register of animalized charcoal. The wonderful chemical power which charcoal displays in neutralizing the smell of putrefying animal and vegetable matters, clearly evinces that it has a strong affinity for, and is capable of absorbing a great deal of the effluvia arising from them. Charcoal being a cheap article, it might be worth the experiment to pound it and cover with it, our manure heaps, in the spring, with a view of saving the gases which are so profusely wasted from such heaps, during their fermentation. There can be no doubt but that this would be better than covering them with earth. This might be the best disposition we could make of our forests of *old field pine*.

Two years ago, after having spread a great quantity of broken charcoal from the sites of old coal kilns, on a lot of greatly exhausted land, intending to marl and manure it, I permitted my negroes to cultivate it in corn. They did this without further manuring, and its product was fully equal to that on the best spot in my corn field. I think this goes to show that charcoal possesses some quality of combining with putrescent manures, and improving the constitution of soils.

W. S. MORTON.

From the Silk Culturist.

SILK BUSINESS AT THE SOUTH.

Mr. Atwill.—Having read in your paper of Dec. 16, an article purporting to be from the Baltimore Farmer, giving account of several gentlemen in Columbus, Ohio, intending to pursue the culture of silk; you will please to inform the Editor of the Farmer, that one of the gentlemen lately visited Northampton, with whom the writer had an agreeable interview. His purchase consisted of 25,000 white mulberry and 200 Chinese mulberry, which may, within a very few years become a profitable concern, and a limited number of worms may be fed upon them the next season, without injury. The gentlemen took a few of the *mammoth* eggs for experiment.

In Virginia also, it is stated that 40,000 mulberry trees (probably the Italian white) had been set out, in the vicinity of Fredericksburg, and that a Mr. Dickinson, who had visited Northampton, (it appears had received the silk impulse) and contemplated setting an orchard of 15 acres, and is "happy to find he shall not *grope* his way alone in the enterprise, as Mr. J. B. Gray of Fredericksburg is going largely into the business."

I have the pleasure of informing these gentlemen that at least two counties in Western Virginia are already several years in advance of the seaboard. Two or more flourishing nurseries of several thousand of white mulberry, 6 to 8 feet in height, may be found in or near Clarksburg, Harrison Co., Va., is not only a nursery of Italian white mulberry, but a more valuable and thrifty nursery of Chinese mulberry, (Morus Multicaulis) to which an addition will be made by the earliest opportunity, from this place.

From this incipient nucleus, it is contemplated that the counties in Western Virginia, may hereafter be furnished with the real Chinese mulberry. There appears to be so much interest taken in the culture of the mulberry that orders are forwarded, for the Silk Culturist, published at Hartford, Ct. The white and Chinese mulberry and eggs were sent to the care of a gentleman in the county of Lewis, to cultivate himself, or to entrust to some other faithful person. The gentleman, with more desire to gratify the writer, than from any expectation of profit to himself, consented to take charge of them, and now is so much pleased, that several gentlemen contemplate pursuing the business in earnest, and even now think of engaging Yankee machinery and experienced reelers. That the business may be expected to "*go ahead*," results from the circumstance of its being a Yankee settlement on French Creek; and it is well known, that where there is a prospect of a speedy or even remote remuneration, Yankee enterprize and ingenuity will not sleep.

Several boxes of cuttings of the Chinese mulberry in the year 1834 and again the present year 1835, have been forwarded to the "*far west*," and orders for more, to be forwarded next spring, to several places in Ohio, Michigan and Illinois.

It is well known, that several gentlemen in Northampton have taken a lively interest in the culture of the Chinese mulberry, and the collection of facts, in relation to the subject of silk culture, and considerable has been manufactured in this vicinity, of superior quality. In this place also, are facilities of obtaining much useful information, of procuring and forwarding the Chinese mulberry.

Respecting Western Virginia, should further information be desirable, I have no doubt that a letter directed to Amos Breck, Esq. French Creek, Lewis County, Va. would be promptly attended to and oblige

D. STEBBINS,
Secretary Agricultural Society.

Northampton, Dec. 23, 1835.

From the Augusta (Geo.) Sentinel.

MACHINE TO GATHER COTTON FROM THE BOLLS.

We have now at our office the model of a machine for picking cotton out of the boll; and to say the least of it, it is certainly a very ingenious piece of work. It is simple in its construction. A number of wheels abreast, have attached to their rims a number of pendulous oval-shaped pieces of wood, set with card teeth bent upward. These wheels are fixed in front of a cart and moved by the motion of the cart-wheels. The cards dip among the branches of the cotton stalk, seize the cotton, draw it out, and as they descend again in their rotation, pass through abreast or space armed also with straight teeth, which relieves the cards and deposite the cotton on the bottom or plain of the cart, whence it is drawn back by hand with a rake, until the cart is full. To us it seems impossible that the machine can pick a field clean; but suppose it leaves half the bolls untouched, it is still a most valuable discovery, if it pick the other half, as fast as a horse can walk from rows end to rows end. Whether it fall or succeed, it is a machine highly creditable to the ingenuity of Mr. Emmons, the inventor.

From the American Gardener's Magazine.

OXALIS CRENATA.

You have no doubt heard much both for and against the productiveness of this bulb. Four years ago I grew it in a small pot, and afterwards threw it out as useless, producing nothing but fleshy fibres. I tried it again last spring, and planted a bulb in ground and earthed it up as we do the potatoes in Ireland: this fall I lifted two quarts at one root. J. B. Smith, Esq., of this city, put a small box round the bulb he had in the ground, and, as it grew, filled the box with earth; it produced half a peck of tubers of the size of small potatoes. If cooked dry they are very pleasant to taste, but if cooked wet they are nauseous: the tops make an excellent salad, and it may be considered a very useful vegetable, and will, no doubt, gain favor.

From the American Gardener's Magazine.

THE TO KALON GRAPE.

In your Magazine for December, I perceive some remarks on the To Kalon grape, and a doubt is expressed whether it is synonymous with the Catawba. Permit me to place this question at rest, so far as my testimony will go. In the spring of 1834, I received by mail one or two grafts of this variety, taken from the parent vine, sent to me by a gentleman residing in the state of New York, who had published a flattering description of its merits, derived from those who had seen the fruit in perfection. I succeeded in raising one plant, which, during the past autumn, matured several fine clusters; and I have no hesitation in saying that the fruit is identical with the Catawba. I compared them in various stages, and could never discover the slightest difference, either in flavor or appearance. They are precisely alike in the oblate form of the berry, the color of the fruit, the period of the ripening, and in the peculiar disease which affects a portion of the berries when they are nearly grown. It has been said, and I find the same thing repeated by you, that Dr. Spafford raised the To Kalon from the seed, probably, of a foreign variety. On examination, the most superficial botanist will readily perceive that the plant bears no affinity to the foreign species. It is, beyond doubt, a variety of *Vitis labrusca* in which species so many valuable native varieties are found. If the To Kalon be a seedling, its parentage is purely American. We have already two grapes, namely, the Catawba and Muncey (and this may perhaps make the third,) which, on the authority of Maj. Adlum, were discovered in different and remote parts of the country; and between them, every point which constitute identity is complete.

T. S. P.

Beaverdam, Va., 1*st. mo.* 12, 1836.

SOME ACCOUNT OF THE LABORS AND IMPROVEMENTS EXECUTED BY THE MARQUIS DE TURBILLY.

[The following extract from the translation of the *Memoire sur les defrichmens*, by the Marquis de Turbilly, though relating to agricultural operations different from any required in this country, nevertheless will be found interesting to every reader who takes pleasure in making, or hearing of, agricultural improvements. The simple and minute details of arduous undertakings carried through successfully by means of untiring industry and zeal, no matter what is the subject, always excite interest. We seem to become personally acquainted with the writer as we peruse his work—we enter heartily into his plans, enjoy his success, and share his regrets and disappointments. It is this kind of minute and natural detail even more than the strange events elsewhere related, which constitutes the great charm of Robinson Crusoe,that universal favorite of both children and men—and if such is the case in a work of fiction, how much greater would be the interest in similar statements of facts. Though possessing poor lands in abundance, we have no heaths in Virginia, or extensive tracts rendered unproductive by such growth as covers the wastes of France and England, as well as by actual sterility—nor have we the rocky and wet soils to contend with, that engaged the care and labor of Barclay, of Ury, in Scotland, whose operations we will present some account of hereafter. Nor would such labors as those of a Barclay or a Turbilly be advisable here, even if circumstances were similar. Perhaps their labors were carried too far to be profitable to themselves—for men seldom zealously undertake the best works, without going beyond the point where correct judgement would have directed them to stop. A schemer may impoverish himself, and yet not less deserve to be considered a benefactor of his country.]

"Upon the death of my father, which happened in the year 1737, I inherited the lands of Anjou, of which I am now going to speak. They lie contiguous, and form a pretty considerable extent.

"Hills and vales render the country uneven in many places; though in others, there are spacious plains, with several brooks, and a small river. The soil is of three kinds, bad, middling, and good: but this last is least frequent. Most of the lands being of a middling quality, are fertilized only by dint of care and manure: wheat grows on one spot, meslin on another, rye on a third; and sometimes it is necessary to sow these three different sorts of grain in the same field; so much does the soil vary: but, in general, we sow more ground with rye, than with any other corn. Buckwheat, barley, oats, hemp, flax, and other equally useful productions, are likewise cultivated in these parts. The vine prospers here very well, especially on the sunny side of banks and higher grounds: our wine, both red and white, is good; our fruit trees thrive well; and so does the white mulberry, of which I made large plantations some years ago. The oak, the elm, the beech, and other forest trees, grow extremely well in these lands. Such is the soil of this district: the climate is mild and temperate, as is the rest of Anjou.

"Three sides of this estate border upon immense tracts of uncultivated heaths which spread through the greatest part of the province, and belong, some of them to the king, and others to different lords, ecclesiastical and temporal. However, the situation of my house, and of the chief village, is advantageous, being nearly in the centre of the whole, and within about six miles of three pretty towns.

"Such was my estate when I took possession of it: not a quarter part of the land was cultivated, and even that very badly: the rest was either abandoned by the husbandmen, or had not been cultivated at all. Most of the meadows along the brooks and rivulets were become marshes, productive of scarce any thing but rushes. The vineyards were ruined, and the woods destroyed. A third part of the farms belonging to the principal parish where my seat is, were un-tenanted, for want of farmers to rent them. The inhabitants of this place were very poor, and did not, in general, raise corn enough of any kind to subsist them half the year: nay, such was their indolence, that they chose rather to stroll about and beg during the other half than be at the pains of bestowing proper culture upon their land, which, with that culture, would have maintained them decently.

"This deplorable condition of my estate, which I have here represented fairly, without exaggerating any one particular, determined me, early in life, to read attentively all the most aproved writers upon agriculture, and to observe carefully every improvement I met with in my travels. Even the campaigns in which I served did not interrupt these inquiries; for agriculture, and arms never were by any means incompatible. Under these circumstances, I resolved to execute upon my own property, designs, which my knowledge of the place, concern for the unhappy situation of its inhabitants, and regret to see what small returns were made by so large an extent of ground, naturally suggested.

"I plainly foresaw that this undertaking must be a work of time; neither my fortune, nor the number of hands I could procure in the country, allowing me to go beyond the clearing and improving of a certain space every year. Some gentlemen of knowledge, judgement, and public spirit, to whom I communicated my thoughts, approved of them, commended my design, and exhorted me strongly to carry it into execution; representing, besides the advantages which would necessarily accrue to me, the general benefit which such an example might be of to my country, filled as it is with numerous tracts of uncultivated land. This last reflection animated me more and more.

"My first care was, to endeavor to extirpate the spirit of indolence, and consequent love of begging, which prevailed among my peasants in general. To this end, I gave public notice of my intended improvements, with a declaration, that I would constantly employ every man, women, or child above eight years of age, who might not have business of their own to do, on condition of their leaving off begging. At the same time I ordered an account to be taken of such as were not able to work. These I afterwards examined more particularly myself, and found among them several who, though they were not fit for hard labor, were capable of doing many useful things, in which I accordingly employed them. By this means, my list of real helpless people was reduced to a small number, which I provided for, till their relations should be able to keep them by means of what they earned from me. A few, and only a few, of these poor objects, who either had no relations, or such as in truth could not help them, became a dead charge; though this soon lessened, and is now inconsiderable.

"An innumerable multitude of rabbits infested my land. Against these I declared open war; being determined absolutely to destroy them. This has already been several years a-doing, and is not yet entirely completed. Some of them still remain, sheltered in their burrows at the foot of rising grounds, and others make incursions from the neighboring woods and warrens. However, they do me no great mischief now; and even then I drove them from the place where I wanted to work.

"In the month of June 1737, I begun my improvements with clearing some of the land near my house. This ground was so poor that no farmer would even attempt to make any thing of it, served only to feed a few stinted cows, and was over-run with briars, thistles, and broom, which, being cut up, and laid in heaps, from space to space, were burnt upon the spot, and yielded a considerable quantity of ashes. These were then spread, and immediately turned in by a single ploughing, lest their virtue should exhale. During the summer, this land was ploughed several times, different ways, in order to loosen it, and endeavor to destroy the weeds. I had bought for this purpose oxen, which are generally used for ploughing in Anjou: but my horses helped them, especially for harrowing. Here my poor peasants, men, women, and children, were employed to break the clods and pick off the stones; and as I had more dung than my arable lands required, I ordered about half the quantity that is generally used in other places, to be laid upon this ground, which was afterwards sowed at the usual time. This first trial succeeded, and the crop was very good; though most of my neighbors were of opinion that all my labor would be lost.

"In 1738, I undertook another piece of ground, adjoining to the former, and of the same kind. I began in March, proceeded as before, dunged it, and had equal success. The second crop of the former spot was still more plentiful. This summer I gave a thorough fallow to ten acres which had long been under corn, and sowed part of them with hemp and flax, for a purpose which will be mentioned hereafter. I likewise recruited my vineyard, and drained my meadows. Numbers of day-laborers were employed in cleansing the rivulets and brooks which run through them. In the winter of this year an accident happened, which had like to have overset my whole undertaking. The oxen which I used for ploughing, and which were grown lean, it was supposed through labor and fatigue, were on a sudden covered with vermin, which eat into their flesh: several remedies were applied, but in vain, the vermin re-appearing in a few days. We knew not to what cause to ascribe this disorder which was destroying animals without whose assistance I could not proceed: besides which, the lost would, in itself, have been considerable. They had hitherto been fed with hay only; though the custom of the country was to mix it with an equal quantity of wheat-straw. As I had not yet a sufficiency of this last, I bought some, gave it to them mixed with hay, and allowed them oats from time to time when they had been hard worked. This mended them a little; but they did not recover entirely, or get rid of their vermin, till they fed on green grass and lay out of doors.

"I begun this year to make new roads and causeys across my meadows, marshes, and rising grounds; for the easier conveyance to and from my fields; the old ways being often impassable in many places. This has been a very long and expensive work; nor it is yet quite finished. I also bought at this time a number of sheep, which have since increased considerably; for notwithstanding the great extent of this uncultivated land, where many of them might easily have been fed, none were ever kept upon it before. The people of the country though they could not thrive there, on account of the marshes, and of a plant called white root, very prejudicial to them, found in several parts of the lay-grounds and commons. Most of these weeds were pulled up at a small expense; and the sheep, who were fond of this herb, eat up the rest, which was so little that it could not do them much hurt, though some of them were sick with it. The constant feeding of the sheep, and their dung, afterwards completed the destruction of this noxious plant, and brought up good grass in its stead. This shews how farmers may often get rid of any such bad weed.

"In 1739 I took the next contiguous land, going round my mansion: a method which I have always followed; so that my improvements have been, from year to year, more and more distant from my place of residence. The soil I now fell upon was tough, strong, and only thin grass grew upon it, with here and there a few brambles and other wild productions, which were soon cut up. This ground was broken up only with the plough: some dung was laid upon it, and I sowed it directly with winter oats, which succeeded very well. My improvements of the two last years yielded plentiful crops, not only of corn, but also of hemp and flax. These last were dressed and given to the women and girls to spin; paying them different prices, according to the fineness of the thread. They applied themselves to their work, and by degrees became perfect in it. By this means I accomplished my design of finding employment for these women and girls all the year round, and afforded them the means of procuring an honest livelihood, as well as to those whom age or infirmities rendered incapable of working abroad.

"The business of the field was always preferred in the seasons proper for it, and when the weather permitted; keeping in my eye Cato's advice, never to work within doors, while there is any thing to be done without, nor to do that in fair weather, which may be done in wet. I have continued this spinning ever since; and have allotted for the growth of hemp and flax particular spots, which I have inclosed with hedges and ditches, and kept in good heart and with fine tilth. They have yielded plentiful annual crops without being rested; only dunging them every other year; for hemp does not impoverish the ground when it is properly cultivated. My vines, meadows, and ways were not neglected.

"In the beginning of this winter I gave my oxen hay mixed with an equal quantity of rye-straw, not having wheat-straw enough to answer that purpose. This succeeded to my wish. My oxen continued in perfect health, free from the vermin I mentioned before, and in better plight than those in the neighborhood, which were fed with hay and wheat straw. I have continued to give them this food as long as they lie within doors, and find it answer extremely well. During this time they have no corn, even though they work; and I do not find that this suppressing of their otherwise usual allowance of oats, renders them at all less hearty and vigorous. This quality of the rye-straw may be of great advantage in countries where oxen are used for ploughing.

"In the year 1740, I was obliged to make a considerable addition to my number of servants, and stock of cattle of all sorts, in proportion to the increased extent of my improvements. It may perhaps be thought, that so many servants would eat me out of house and home. This I had guarded against from the beginning. All those employed in my husbandry lived by themselves, in some of the out-houses, where they had their own kitchen, and a certain stated allowance, suited to their usual manner of life; so that they had no sort of connection with the others, whose more immediate business it was to attend me.

"The land which I improved this year was covered with heath, broom, and furze, which had grown very thick and high. In the spring, when the weather was dry, I set fire to this surface, after taking due precautions to hinder the flames from spreading too far. The whole burnt very well, and I was in hopes of being able to plough up this ground without paring off the turf, as I had done with my other land the year before. This would have been a considerable saving; especially as the ashes were ready spread. But I should have considered that different lands require different treatment. Ploughs, stronger than usual, were made on purpose for this work; but the roots of the furze and broom, which had resisted the fire, broke them; and though I doubled the number of my cattle for draught, several of the oxen were ruined by this hard work, in which I persisted with too much obstinacy. In vain did I plough it over and over, and break every clod both before and after sowing it; the broom and furze were not destroyed, but made new shoots every where: the land continued unkindly and sour, and the oats which I sowed in it yielded scarce any crop; in short, repeated ploughings and dunging were necessary during three years, before it could be quite extirpated. I came badly off in this experiment: but my former improvements, which I had continued to manure and sow, luckily produced an abundant crop: that of the last year yielded a good quantity of wheat, which kept up my establishment, though it did not compensate for the loss I now sustained. However, this disappointment did not discourage me. It raised the laugh of the whole country at my expense; especially of those who had foretold from the beginning, that I should not succeed. I gave them the hearing, and only resolved not to fall a second time into the same error.

"This year I established a nursery of fruit-trees, and also of forest trees from other countries. This nursery which succeeded very well, was of great advantage to me afterwards, to fill up the different plantations which I made as my improvements extended. I likewise repaired my woods, which had formerly been destroyed by cattle and deer. I surrounded them with ditches planted with hedges, in order to bring them into regular yearly cuttings; to which end I grubbed up such trees as were stinted in their growth, and filled every empty space, either with young plants, or the seed of others, according to the nature of the ground. By continuing to do this every year, my woods are now in excellent order, and afford regular cuttings, at the small expense of keeping the fences in repair.

"In 1741, I had the same kind of land to deal with as the year before; but took care not to commit the same fault. Each day's cutting of the heath, broom, &c. was burnt, with proper precautions, as the workmen advanced, and the whole surface was dug by hand as it was cleared. By this means, the ashes of these plants preserved their fertilizing quality, and their roots were pulled up. Women and children shook the earth from off these roots, and turned them, whilst they were drying in the hot weather. These were also laid in heaps from space to space, and burnt upon the spot, where they yielded some ashes, which were spread, and immediately buried with one turn of the plough.

"During the summer, this ground was ploughed several times; each time in a direction different from the former. My cattle were but little fatigued with this work: the heath, broom, &c. was almost entirely destroyed, and the sourness of the land was in a great measure cured. I had then begun to make composts, which were mixed with the dung of the stall and stable, and proved of singular benefit. With their help, I was enabled to manure my newly broken up land sufficiently; that is to say, to lay upon it half the quantity that is generally used of dung for the common run of lands. I sowed this piece with rye, which yielded a plentiful crop. The crops from my former improvements, which I continued to sow without resting them, were likewise very good this year, excepting that of the last, which was also under rye, and yielded but a middling produce. My vineyards were now brought into as good order as any in the province; and I continued draining my meadows, and main roads and causeys.

"The war then calling me into Bohemia and Bavaria, I foresaw that I should be absent some time, and consequently not able to spend part of the year in the country, as I had used to do; to give directions to my people, and see my orders executed. Under these circumstances, that my improvements might not stop, I gave the direction of the whole to an intelligent servant, who had lived with me a long while, and was married to an excellent housewife: and to interest him the more in the future success of my undertaking, I agreed to allow him half of the profits of every kind; subjecting him to this only restriction, that he should not impoverish the ground by too many crops. In this state things went on till the end of the year 1748.

"In the mean time new pieces of land were broken up every year; but not so extensive as the former; the expense of my campaigns not permitting me to lay out upon them so much money as before. I even straightened myself, not to interrupt the progress of my improvements: which, in general, succeeded very well. I also revived an old method of breaking up land, by cutting off the surface with a paring mattock, and then burning it.

"During the whole of this time, I was but two years together without visiting my estate, where my presence was then very necessary. In all the other years, I gladly accepted the leave which was given me to see how my works went on; though I sometimes did not stay above a fortnight among them. However, this was enough to give an eye to every thing that was doing; which is of great consequence in undertakings of this kind.

"Peace being restored, I resumed the personal guidance of my affairs in the beginning of the year 1749, and placed my old servant in a farm which I had to let, where his profits sat him down at his ease. Though he was extremely faithful, and my improvements were carried on very well, yet I found that, for want of due care and attention at certain times, the crops were not equal to what they had been under my immediate direction: a circumstance which plainly shews, that a work like this never thrives so well as in the hands of the owner himself.

"I now resolved to pursue my improvements as before the war, that is to say, to break up larger tracts of ground every year, than had been done of late. Most of my yet uncultivated lands were, and had been from time immemorial, thick covered with high broom, heath, fern, &c. and experience had taught me that these were not to be broken up with the plough alone.

"Of all the methods which I tried, none seemed to me, as I said before, so good as the paring-mattock and burning. I therefore fixed upon this, and, in consequence, sent for the workmen I had formerly employed in trials of this kind: but their number not sufficing for the extent of ground which I purposed to break up this year, I sent for others from a distance, and was weak enough to let these last persuade me to contract with them at a set price, for paring the whole surface. I agreed to give them even more than they ought to have had for doing the work ever so well; for I was not yet thoroughly acquainted with the nature of this business. They began it in March; and to earn their money the more easily, or rather to rob me, only skimmed off the mere surface, without hardly touching the roots of the plants, which they should have cut off. When this work was done, as they called it, for the burning part did not belong to them, they immediately came to me, and asked for their money, which I simply gave them, not suspecting the cheat, but only thinking they had earned it very soon. When the turf of their cutting was dry, I ordered it to be laid in heaps, and burnt. The small quantities of ashes which it yielded, made me suspect the roguery: but when I found that the roots in the earth broke some of my ploughs, in cutting only a single furrow to cover the seed, and that there was no clearing it of clods, I was thoroughly convinced that I had been the dupe of these people, and that this paring would be of little service. The wheat sowed in this ground rose indeed pretty well, and looked tolerably during part of the winter; but not being able afterwards to strike through the crust formed by the remaining matted roots of the plants, most of it died, and the little that remained scarcely returned the seed: nor could this land be recovered till the next year, even by ploughing, breaking the clods, and dunging.

"The bad success of this experiment, upon which a great deal of money had been thrown away, tried my patience, but did not discourage me. My neighbors began anew to exclaim against my projects, as they called them; and numbers of those people who are determined at all events to oppose novelty, be it right or wrong, were pleased to vent their sarcasm at my expense. I let them talk on. The roguery of the people who had last pared my ground did not hinder me from still thinking that this was the best way of breaking up new land, especially heaths; and the event has shewed that I was right. This check, which was the last I received, made me resolve to take my measures better for the future.

"The rest of my improvement yielded very good crops this year, during which I continued to mend my roads and meadows. These long winded works, for which only a certain space of time, and a certain sum of money, could be allotted every year, have been continued ever since, and indeed are not yet finished. I likewise bought this year several hives of bees; though I had some before. These useful creatures have multiplied exceedingly; especially in a little garden, where my chief apiary is, situated between meadows and heaths, of the flowers of which they are remarkably fond. Though these industrious insects thrive perfectly all over the country I am speaking of, yet the inhabitants of these parts not only have not a tenth of the number they might keep, but ignorantly follow the old barbarous custom of destroying the bees, when they want their honey, instead of only taking part.

"I did not agree by the piece for breaking up the land I intended to improve in the year 1750, lest I should be again deceived; but hired proper laborers by the day. They began their work in March, and finished it about the middle of June; cutting all the way deep enough to go under the crust, or net-work, formed by the roots beneath the surface; for I took particular care to see that this was done. When the turf thus pared, to the thickness of about four inches, was dried, piled up, and burnt in heaps from space to space upon this ground, it yielded a considerable quantity of ashes, which enriched the soil for a long time. Wheat was then sowed, and the plough easily turned up the furrow which covered the seed. Women and children easily broke the clods of this ground, which was thereby at once brought into good order: the roots of all the wild plants having been effectually cut through, and their seeds destroyed by the fire. My wheat, by this means unincumbered with noxious productions of any kind, flourished well, and yielded an excellent crop; as also did such other parts of my land as were under corn. The success of this year revived my hopes. I now perfected my method of making artificial dung, which, as I have already observed, proved of infinite service; and, for manuring my more distant lands, I built upon them perpetual kilns, which have always supplied me with a sufficient quantity of ashes.

"This year I began to plant white mulberries, in order to feed silkworms, and make the inhabitants acquainted with the management of them. I have since continued to make plantations of this kind every year, and find them answer perfectly well, especially in light soils. Several of them are an useful embellishment to proper parts of my improved lands, and I have alleys of them, which, though not suffered to run up high, form a very pleasing prospect.

"In 1751, I again succeeded perfectly well in my new method of paring and burning. All my cultivated lands now yielded very good crops; and that in particular which I had broke up last year, and since dunged properly, that is to say, with half the quantity commonly used upon ground in general, produced more than any other equal space had yet done. From this time I continued to dung all my grounds which were broken up in this manner, every alternate year.

"My improvements were now become so extensive, that I was again obliged to increase the number of my servants, and of my ploughing cattle. The same thing happened more than once after this; but I shall not mention it any more. My cattle too, of different kinds, had multiplied so much, that I had no longer room for them in the old farm yard, or buildings belonging to it; but plainly saw, that if my improvements were enlarged every year in the manner they had hitherto been, I should soon want more yards, and more buildings: to keep them in. I accordingly marked out proper places for this purpose, and drew plans for more spacious buildings.

"As the cattle in this country are small, I bought some of a larger size in Poictou (from whence we generally have our working beasts,) and particularly a fine bull, to try if I could mend our breed, and thereby have of my own oxen strong enough for the plough; by which means I should save the expense of buying them elsewhere. I have not yet succeeded in this, so far as I could wish; probably because my pasture is not yet good enough. However, my bullocks, proceeding from this race, are much stronger and bigger than those I had before, though not large enough to be yoked to the beam, but only before or with others.

[*To be continued.*]

TO CURE THE SWELLING OF THE THROAT IN HOGS.

To the Editor of the Farmers' Register.

In order to contribute to the usefulness of your valuable periodical, and to inform the public of what I find from experience to be an infallible cure for a certain disease with hogs; viz. the swelling of the throat, I herewith send you a receipt for this disease, with a desire that you publish the same in your work if you deem it of any import, and the same meets your approbation.

Take of molasses one-half a pint and a tablespoon full of hogs' lard, to this add of brimstone a piece an inch in length. Melt it over the fire, and when cold or in a liquid state, drench the hog with it, and nine times out of ten it will be found to have the desired effect.

My hogs were affected with this disease during the past year, and I found the above to be effective when all things else failed.

GOLD FISH.

In the manufacturing districts, (of England, says Dr. Hodgkin,) where there is an inadequate supply of cold water for the condensation of the steam employed in the engines, recourse is had to what are called engine-dams or ponds, into which the water from the steam-engine is thrown for the purpose of being cooled. In these dams, the average temperature of which is about 80°, it is common to keep gold fish, the *ciprinus aureus;* in which situation they multiply much more rapidly than in ponds of lower temperature exposed to the variations of the climate. Three pairs of this species were put into one of these dams, where they increased so rapidly, that, at the end of three years, their progeny, which was accidentally poisoned by verdigris, mixed with the refuse tallow from the engine, were taken out by wheelbarrows full. Gold fish are by no means useless inhabitants of these dams, as they consume the refuse grease which would otherwise impede the cooling of the water by accumulating on its surface. It is not improbable, that this unusual supply of aliment may co-operate with increase of temperature in promoting the fecundity of the fishes.

From the Silk Culturist.

PROFIT ON SILK MANUFACTURE.

The Connecticut Silk Manufacturing Company in this city, have declared a dividend of four per cent. on the capital stock of said company, payable on demand. This being the first dividend of the company, may be regarded as settling the question that the manufacture of silk can be profitably prosecuted in this country, and that money invested in it is sure to give a fair per centage. We do not know the precise time for which the dividend was declared; but we know that the factory has been in operation a few months, only, and that but fifty per cent. of the capital stock has been called in, and that a considerable surplus of profits remain undivided. We hope manufacturers of wool and cotton, and especially the latter, who have been for years struggling along without dividends or a prospect of them, will look at this subject, and see how much more it is for their interest to make their investments in the manufacture of silk than cotton. Many cotton factories have been in operation for years, and as yet their stockholders have not received a cent by way of dividend; while those of a silk factory which has just started into existence as an experimenter, have received from 8 to 12 per cent. on their investments.

From the Genesee Farmer.

GREASE FOR WHEEL-AXLES.

It is chiefly to give consistency to the composition that tar is mixed with grease for the hubs and axle-trees of wagons; and it answers this purpose well while it continues to be soft; but as the oily parts escape, the tar approaches to the nature of pitch, and absolutely increases the friction. Travellers who use this preparation have therefore to apply it frequently. During the fatigues of a journey, even the care of such repetitions is unpleasant; and we have long since entirely discarded tar as a lubricant.

It is now more than twenty years since we employed the following composition which was revealed to us as a great secret, and for which money had been usually demanded: Thicken half a pint of melted grease with black lead in powder, having previously thrown in and melted a lump of bees-wax of the size of a small hickory nut. Apply it to the hubs and axles before it hardens.

By using this composition we have on various occasions driven our carriage two or three hundred miles without once greasing it after we started; and subsequent examinations have satisfied us that no attention of the kind, is necessary on such journeys.

We add a few precautions. In warm weather, we use tallow in preference to soft grease. Black lead is sometimes gritty—that is, contains sand, and such should be rejected. If tar has been previously applied to the hubs and axles, it ought to be very carefully removed before the composition is applied; and until the pores of the wood become filled with the composition, it may escape from the boxes in that way, and render frequent examinations for the first few weeks, necessary.

DESULTORY REMARKS ON RAIL ROADS, AND OTHER PUBLIC IMPROVEMENTS.

To the Editor of the Farmers' Register.

Camden, S. C. Feb. 8, 1836.

Accept my thanks for the Farmers' Register for February, 1836. Its contents are useful, and well worthy an attentive perusal.

The Petersburg and Richmond Rail Road Report leads me to express my regret, that instead of an attempt being made to bring two rail roads to the Roanoke, the money destined to one had not been applied to the laying down another link from Raleigh to Fayetteville. It would have rendered more service to both Petersburg and Norfolk. The slang about the inlets of North Carolina is, I see, revived; as though any thing could attract to the coast, and thence, by the by, to New York, (how patriotic and neighborly!) any produce which shall find its way to Gaston. The canal *will take it* to Norfolk. "Raleigh" in the Raleigh Register of the 2nd, says—"the Gaston road will intercept all the trade from the west, and the greater part of the products of east North Carolina will be shipped from its coasts"—to where? New York. This is an error; and fact upon fact, like "Alp upon Alp," can be accumulated, to prove it a grievous one. But I have no room for argument.

If the parties should fail to get subscriptions, and can compromise, they should aid both roads to Wilmington and Fayetteville, on condition that the latter place especially, should extend one to the state line, opposite Darlington, S. C. This it must do in self-defence; for, with the disposition in South Carolina, to bring a road from the Hickory Gap, N. C. to Rutherford and Yorkville, S. C. it is more than probable a road will be laid down to Raleigh via Montgomery and Chatham: whereas, if Wilmington and Fayetteville will unite with Richmond, Anson and lower Mecklenburg, N. C. the former will have the only chance it can have of becoming a port. Thus, it may bring to the Cape Fear all the trade of eastern South Carolina, which Charleston is willing to exchange for—a steam boat communication with Wilmington.

I am astonished at Mr. Barton talking of the rail road from Richmond to Lynchburg, being "a *rival* improvement to that of the James." There is room for both—the one for live lumber in the shape of both bipeds and quadrupeds—the other for produce of a weightier and less elastic description. Mr. Barton does not recollect that the experience of the Baltimore and Ohio Rail Road, and, I believe, that of Pennsylvania, has, and will demonstrate, that canals will "hold their own." Hence, if my changed opinion is worth a straw, I should say that a rail road from Lynchburg would assist, instead of injuring the improvement of the James; and I hope the legislature will grant a charter, and a survey be commenced. Let not Petersburg be alarmed. There is room enough for Richmond, herself and Norfolk. The Valley folks will be at work for the benefit of Baltimore. This should be well recollected. As to Buchanan becoming the *terminus* of the Nashville road, it is out of the question: and moreover, it is a sentiment which, if you wish to keep up the spirits of the Tennessees, East and West, ought not to be even whispered. Mr. Barton says, "there is no point where the salt and the plaster of Washington and Smythe can strike the James improvement so *cheaply*, or at so *short* a distance as at Buchanan." It can more "*cheaply*" at Richmond, however different may be the distance.

I have read Mr. Barbour's address with delight.* It should be printed as a tract and circulated through the state. Can he obtain the aid of any active member of Congress to the bill for enlarging the Topographical Engineer Corps? Can he do more? Can he urge its duplication, its triplication, aye, its quadruplication, and get a party in Congress to advocate a geological survey of the United States, before Mr. Benton gets his fortifications erected at places *to which there are no roads*, or Mr. Clay gives the public money *to be squandered by quacks, who govern the legislatures of many of the states?*

I cannot but feel gratified at Mr. Walker's correspondence in the Register. I think he is right, and I should like to see a sort of day of judgment arrive, when all the arguments, and all the theories, broached from 1789 to 1836, and especially those on the subject of the United States tariff, should be brought before the bar of public opinion. I seriously think they would prove the waste of much paper, ink and time; and what is more, a serious injury to the body politic. Charles Fox boasted his ignorance of political economy. I believe him to have been right.

We want a general view of the progress in Virginia and North Carolina of the rail road affair.

Is the great road to be laid down from Winchester to the Tennessee line, and what is to be done with Kentucky? Are the turnpike road proprietors, from Augusta, (Ken.) to Frankfort, and thence on both sides of the Kentucky, to near Crab Orchard, prepared to yield their honest claims and I hope profitable investments, to the "splendid conceptions" of the Cincinnati and Charleston road, and to cower to quacks, claiming the original merit of a work already devised, and partially carried into execution—at least, in such a degree, as to have traversed half Kentucky, and thus far to have commenced without their knowledge, omniscient as it is, a large portion of their sage scheme?

Are not the Louisville and Lexington Rail Road proprietors prepared to bring their road via the Licking to Evansham; and those of Evansham to the Roanoke at Weldon, where, I repeat it, I trust the road from Raleigh will terminate.

I will conclude this desultory epistle, by asking your interference, and that of your friends in the legislature of Virginia, Pennsylvania, New Jersey, and New York; in favor of a clause in all rail roads acts, to which these various states contribute the public funds, by either loan, donation or subscription, compelling the companies so sustained, to carry the United States mail free of

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*It is presumed that our correspondent refers to the petition of the Agricultural Convention, to which the name of Gov. Barbour, as President of the Convention, is subscribed. The petition was written by James M. Garnett, Esq.—Ed.

any expense, and thus enable the government to pay contractors less, and postmasters more, than they do at present. At the same time they will relieve the public from a heavy burthen. *Exempli Gratia.* Pennsylvania is about to advance money to some amount to her canals: New York the same: New Jersey virtually the same. What is to prevent then, annexing this condition to their acts?

I wish an early and immediate attention to be paid to the request about the survey and the mail, and shall feel obliged by your exertion in its favor with your congressional friends, and through them with their correspondents in the different state legislatures. And I would hope for the relinquishment of the opposition to the Lynchburg and the Weldon Rail Roads, and the adoption of those of which I have spoken.

G. L. C.

ADDRESS TO THE AGRICULTURAL CONVENTION OF VIRGINIA.

Delivered by the PRESIDENT, JAMES BARBOUR, Esq., in the Hall of the House of Delegates, 1836.

Communicated for publication in the Farmers' Register by request of the general committee of the Convention.

Gentlemen—For the kindness you have vouchsafed to me in calling me to preside over your deliberations, I return my thanks, and assure you in sincerity, that there is no distinction to me more grateful, than that of standing well with the tillers of the earth. To this station custom has assigned the duty of explaining the object of our meeting: with your leave, I will proceed to its fulfilment. You will have to content yourselves with a desultory discourse, from one long disused to public speaking—and whose only pursuit for years past, has been the superintendence of the plough.

A general conviction exists, that the system of our agriculture, as well as the general condition of Virginia, especially this side the Blue Mountains, are far below the level to which they are entitled.

I should indeed have lived to little purpose, had I not long since have known how infinitely more agreeable it is, alike to the speaker and to the audience, to descant on a palmy state of prosperity, than to give utterance to the Jeremiads on misfortunes—as different indeed as between the cry of the warder on the tower of some beleagued city that "all is well," and the fearful note that "the Philistines are upon thee." Standing here as the organ of the tillers of the earth, whose deep sense of the existing and increasing calamities of their country have gathered together, I should ill repay the confidence wherewith I have been honored, did I not fearlessly perform the duty assigned me—and take for my example the good physician, who probes, (careless of the pain he produces, if necessary) the wound he has been called to cure—and applies the proper remedy—though it should be the severe one of the cautery, or the knife. In this spirit I shall proceed.

What is the condition of our country? In answer to this, I call your attention to a spectacle, without an example in any other part of the globe. Vast regions, once the abode of a numerous population, of plenty, and of social happiness, have been re-committed to the forest—and their original inhabitants, the wild beasts, re-established in their primitive dominion. That a result of this kind has occurred where a barbarous conqueror, Attila like, has swept the face of the country with the besom of desolation, or where dread misrule has caused the population to recede before the rod of the oppressor is true—but in no instance where the hoof of the conqueror has not defiled the land, and where peace and freedom have held undisturbed sway, as in our case, has such a thing occurred. Other large portions of the commonwealth—though not in this extreme condition—still present the most discouraging prospects—wasted fields, houses threatening their inhabitants with their fall—and depopulated districts—while our people by thousands and tens of thousands, are leaving us, as they hope, to better their condition—and these evils are daily increasing. When and how these great mischiefs are to be stayed in their career, are questions that address themselves with an irresistible pathos to every lover of his mother land. We have met together to ponder on these fearful questions—to interchange our views and opinions, and to contribute our share to their remedy—if, indeed, remedy be possible; this is the object, and the only object of our meeting.

In pursuit of this, it is indispensable that we should discover, if we can, the probable causes of the ills we deplore. To refer to them all would be beyond the occasion; to point to those the most prominent will be all I shall undertake—leaving others, without a comment, to the intelligence of the Convention.

Were I to select the most disastrous of all the causes which have contributed to our misfortunes, I would say at once, it was the lack of capacity of proprietors to manage their estates. Instead of personally superintending them, with the qualification essential to such a situation, they have deputed their management to hireling superintendents, not unfrequently as ignorant as themselves—and to complete their ruin, have paid these hirelings with a share of the crop. These, as was natural, looked only to the present year—the future being left to take care of itself. The lands capable of producing, were annually cultivated till exhausted; improvements of every kind neglected, and in effect, the whole country by this simple process was as though it had been under an annual rack-rent—with no restrictions on the tenants, and with no supervision by the proprietors. Now, were we told of a country that had been tenanted out in this wise for two centuries, it would be no matter of surprise to us to be told further that it presented one wide field of desolation. Such, in effect, has been our system, and such have been its effects. In support of this view, we have only to refer to instances where a contrary course has been pursued; where an intelligent proprietor has superintended in person his own estate, and where almost invariably, the result has presented the most palpable contrast to the waste and desolation growing out of the former custom. While these exceptions (and I am sorry they are so rare,) prove the justness of the position I have advanced, they furnish at the same time, a well grounded hope, that if the latter practice could become general, it would tend much to repair the injuries of which we complain. The system of hireling superintendents became more mischievous by bringing about a general impression that husbandry was a *menial* pursuit—and hence, beneath the attention of a *gentleman*. The *mind* of the state was seduced thereby from this noble pursuit. All rushed to the learned professions. A general mania prevailed through society. Every lad, with or without capacity, was to make his living rather by his wits than by his hands. These professions became, in consequence, crowded to excess. The weaker members went to the wall, and instead of being useful cultivators, finished their career as incumbrances to society.

The place where I stand admonishes me of the delicacy of another branch of the subject, on which I am now treating—but, to which it is my duty to refer—the prodigal waste of mind and time to politics. That eternal vigilance is the price of liberty, is readily conceded: that liberty is a prize of inestimable value, that may be weighed against any other human blessing and accepted as an equivalent, is a great truth that I not only readily admit, but would most zealously inculcate. To preserve our free institutions inviolate, is therefore our first duty; but it is not our *only* duty. They are, or were so intended to be, *means* only of promoting the happiness of society—not the *end*. Yet with us, politics, like Aaron's serpent, have swallowed up every other object, and have degenerated to the humble purpose of contending who shall be our masters; for at this day the old-fashioned term "public servants," prevalent in the simplicity of ancient manners, would be a cruel mockery. Every other purpose is held insignificant when compared with this. To the politician by trade, agriculture, and all its great interests, are held in utter contempt. He is engaged in the higher pursuit of promoting, as he says, the interests of the good—of the dear people—and if he succeed in securing to himself some fat job, or triumphs over a political rival, he satisfies himself that he has achieved all that should be required at his hands. Who can estimate the serious injury to agriculture, and indeed to the general prosperity, by these wasteful diversions of time and mind from their proper pursuits? To reclaim them, and give them a judicious direction, is an object of the highest consideration.

Another cause contributing to our depressed condition, is the emigration of our people. That this is in part to be accounted for by the restless spirit of man—too frequently dissatisfied with his present condition, and yielding himself up to brighter prospects, often to be disappointed, which prompts him to distant adventures, may be admitted; but that this emigration in part must be placed to the exhausted condition of our country, cannot be denied. Whatever of compensation is acquired by the increase of elbow room to those who remain, it is not to be disguised that it draws after it in many respects disastrous consequences. Virginia, for the last sixty years, has been the great hive from which have gone forth numerous swarms of emigrants to the south and west. The very fact of removal to distant lands shows the spirit of enterprize by which they are impelled. They leave behind them those, too comfortable to move, and who therefore will not go—and those so poor they cannot. The head and tail of society are thus left; the vital part attends the emigrants. I speak, of course, generally; thousands of exceptions may be found in those who go, and in those who stay. With a large share of the enterprize, the emigrants carry with them the capital for which they have sold their property, and withdraw it of course from the country left. This is not all: how many thousands, for years before their departure, in anticipation of their removal, have pursued the destructive plan of taking the scum of the land, by an unmitigated cultivation, leaving the skeleton they have made to their successors. These mischiefs, if confined purely to husbandry, are great. But if (which Heaven in mercy forbid, and against which I offer up nightly my prayers,) the heavy curse is in store for the American people, of a dissolution of the union, and the consequent dependence of each state on its own peculiar resources, then indeed the evils of emigration will have been multiplied a thousand fold. Although patriotism may deprecate this great mischief, yet who can cast his eye over the troubled scene, that does not read in the signs of the times, shadowed forth amid the rockings of the political elements, omens, boding great evils.

Another cause of our wasted country may be found in the exhausting crops so long cultivated without an intervening one of melioration; and these crops being exported. It may here be remarked, that a theory with many respectable advocates is gaining ground, that an exporting country is necessarily in a progressive state of deterioration, while the reverse is the case with an importing country. The supporters of this theory point to Sicily and Spain, the former granaries of the lazy and insolent populace of Rome, and in modern times to Poland and the countries washed by the Baltic, once fertile and great exporting countries, and all now reduced to great poverty—while England, not originally to be compared, at least to the former two, and as I think much inferior to ours, has advanced to a state of improvement, whose like, no eye in any age has seen, and which is credible only to the beholder. Without discussing the justness of this theory, I would fain hope, that it will not be true here, where our means—so abundant in our fertilizing marls—and our improving crops of clover, aided by the free use of gypsum, furnish so efficient a restorative.

In enumerating the causes of our agricultural paralysis and general decline, the state of our society cannot with propriety be overlooked. It is now passing through, and has been for years, a violent revolution. Our ancient and wealthy families, a once numerous class, have disappeared. Their hospitality or prodigality, (according to the taste of the audience,) with the coparcenary principle in the distribution of property, have tended to this result. Their's was the maxim to sell nothing they could eat, in contradistinction to that of the severe economist, who eats nothing he can sell. Young men raised in this luxurious indulgence, incapable of enterprize, stick like suckers to the parent stock, till they have exhausted it, and all have gone down together. Too proud and too lazy to beg or to dig, and having lost their caste, they occupy a false position, alike fatal to themselves and to the society of which they are members. For, to this in great part is to be ascribed that present plague-spot on the body politic—an universal craving after office; a craving so intense, that, as in the hunger of Esau, they are willing to sacrifice their birthright of freedom for a mess of pottage. Necessity however, a stern but sure reformer, is at work—and all must soon be convinced that the original curse, if indeed a curse it can be called, denounced against our kind, that requires we should earn our bread by the sweat of our brow, is unrepealed. I forbear, however, to dwell longer on the gloomy side of our affairs, and cheerfully turn to a more exhilerating prospect—the vast resources of our country, and the means of their developement.

With pride I feel warranted in asserting, that there is no portion of the earth of the same extent, on which Heaven has dispensed a larger share of its bounties, than on this ancient commonwealth. In addition to our fine climate and comparatively fertile soil, look where you will, to the east, to the west, or to the interior, you will find some peculiar blessing adapted to the wants of the conterminous region. In support of this broad assertion, I refer with pleasure to the late geological reconnoissance by the distinguished Professor Rogers, directed to objects of the greatest importance, and, as far as I have seen, executed with great ability; a measure, honorable to the legislature directing it, and which I hope will continue to receive its continued patronage. From this, and other sources of information, we know that while the eastern portion of the state contains exhaustless beds of the richest marls, whose application to the soil ensures the most ample returns, rendered accessible to all by its position on the shores of its fine navigable streams, in the western section we find the bowels of the earth filled with the most valuable minerals. What a mine of exhaustless wealth does that region present in her salt waters, of which, millions of bushels of that necessary of life, salt, are already manufactured—and capable of indefinite extension—and where, as through an especial bounty of Providence, the coal abounds to an extent that cannot be consumed, in a stone's throw of the salt springs. The interior too is no less bountifully supplied. Coal, gypsum, ores of iron, lead, copper, and gold, to which may be added as most important of all, the almost countless springs, so varied in their properties as to furnish remedies to every disease that flesh is heir to—and in short, whose waters may be said, without a figure, to be for the "healing of the nations." To these add, our fine rivers—for which nature has done so much—and to complete the advantages of which so little is required of man—and what a theatre do we present for the action of an enlightened statesman—whose genius expanding over this fruitful region, might quicken into life these hitherto comparatively dormant treasures. To such a mind, how insignificant must appear the little party contests for office, compared with so great an achievement!

We come, therefore, to the most interesting and most difficult part of our duties. What is to be done? I am not sanguine enough to suppose that mortal man can apply an immediate and effectual remedy to the waste of centuries—or forthwith reform habits, which have been confirmed by ages. But I do hope, by beginning a judicious system of reform, and pursuing it perseveringly, that its benefits will be successively made manifest—and thus growing in public favor, it will in time be co-extensive with the evils with which we have to contend.

The first step is, to elevate the pursuit of agriculture in public opinion. To do so, give it a position at the University, by establishing a professorship of agriculture. Put it on an equal platform with other sciences. Place her disciples abreast with those of the most favored branches of learning. Let diplomas be awarded to the distinguished—and thus bring back to her standard that large portion of mind to which she is entitled, and which heretofore has been so prodigally wasted. Your professor, a man of science and experience, would soon fashion it to the best uses. Add your experimental farm, where theory might bring her principles to be tried by the only infallible test, experiment—the results furnishing well ascertained principles, to be digested into a code, and harmony and certainty produced, where all is now doubt and confusion. An establishment thus sanctioned by authority, and fruitful of such great good would become an object of popular favor, and every citizen of the least patriotism would seek to aid it. It would instantly become the rallying point of the now scattered intelligence of the land. Every farmer would feel a pleasure and a pride in communicating every supposed discovery, invention, or improvement; and these after being tested, might be universally diffused—whatever was beneficial to be immediately adopted; whatever useless rejected. Here too may be tested the aptitude of our climate and soils to every production—the vine and the mulberry, for example. We have every guarantee, as I think, to their successful cultivation: but what individual has fully tried them, or will encounter the delay and expense, when the result may be doubtful? As individuals, we are too poor—and every succeeding generation must be poorer. Whenever mankind multiply as rapidly as we do, and the coparcenary principle of distributing property prevails, it is inevitable that the fortunes of individuals must decrease—(I am not arraigning the principle, but speaking of its effects.) These, and all costly and doubtful experiments must be made at the public expense, or they will not be made at all. And yet upon the two articles referred to, if success attended the experiment, the gain of twenty millions annually to the American people would not be an unreasonable estimate. I am told that Connecticut, with a praise-worthy liberality, gave some fifteen thousand dollars to encourage the growth and manufacture of silk, and that her people, in consequence, have already succeeded to a wonderful extent. What is there to prevent similar success in this region, where physical advantages seem to be on our side? Here too, every implement of husbandry might have its proper worth assigned to it, as well as every new invention. One experiment, instead of many, will save both time and money. It will alike save the farmers from the tricks of the impostor on the one hand, while on the other, no one will be deterred from adopting an improvement, when sanctioned by such authority. Those who have suffered by the former, hesitate to profit by the latter. I remember after the wheat-thrashing machine had been in successful operation with us for twenty years, I was written to, and by the president of an agricultural society too, not a hundred miles off, to ascertain whether it really was so.

I am aware there are thousands, wise in their own conceit, who would think these things useless. It is sufficient to make a general remark: the most ignorant are generally the most confident. Ask one of these knowing men the simple question "pray, sir, how much wheat do you sow to the acre?"—ten to one he would not know; and a hundred to one he does not know what ought to be sown. His ignorance would not be confined to the wheat crop alone.

By the establishment proposed, a fine opportunity is presented of redeeming a pledge given at the creation of the Literary Fund, which was, that the state should adopt a youth from the then each senatorial district, to be selected by the delegation of each branch, on account of his moral and intellectual worth, and whose poverty deprived him of the means of educating himself. There is indeed, no written memorial of this pledge. I claim the paternity of the Literary Fund, and speak advisedly on this head. In times past, before my portion was not that of a step-son, I had some little influence in this hall. It was before the prevalence of that Sirocco, which for years past has swept the land, overwhelming every opposing obstacle in its resistless course, by which I, and thousands wiser and better than myself, have been overwhelmed, thrown off as wrecks on the strand, at which the scornful finger of the victors point. Desolate as I may seem to the successful politician, I am not without my consolation. No kind angel indeed interposed to save me from the consuming blast—but I have that which I would not exchange for the presence of angels—an abiding conviction that I have in every situation in which I have been placed, to the extent of my abilities, served the commonwealth with an unshakeable fidelity. I refer not to these things for the purpose of inflaming party feelings; no, far from it—would to God I could throw oil on the waters and allay the storm that threatens to tear out the very bowels of the republic—but I refer to them as an act of justice to myself, and as due to the fidelity of history; for in the furious persecution of the times, when it was thought proper to render my name odious, some friend urged that I had rendered some service to the commonwealth, and pointed to this among other instances. It was denied to me, and claimed for another. On my return from Europe, my friend informed me of this injustice. I carried him to the office of the clerk of this house, and was fortunate enough to find the original bill, in my hand writing. It was then objected that the beginning was small. The answer was, "so was Rome"—but Romulus was nevertheless the founder; and I renew, after the lapse of a quarter of a century, the expression I then made, that the measure of my ambition would be full to overflowing, were the truth recorded on the slab that shall point to my remains —"here lies the father of the Literary Fund." If any one object to this as an untimely digression, I must invoke his indulgence on the ground that it is, in all human probability, the last occasion on which I shall publicly address any portion of my fellow-citizens; that it is the long farewell of an old servant, who devoted upwards of thirty years to the public service, and whose only wish now is, that he may have justice done him, in the award of those who come after him.

To come back to the subject in hand—the redemption of the pledge. It is quite fresh in my recollection that it was objected that the establishment of a University would be an aristocratic measure. We all know how easy it is to get up this mad-dog cry. Although in very truth, an entire county with all its wealth would scarcely be equal to the making a real full-blooded aristocrat, yet with us it is sufficient to fix the "suspicion of being suspected" against any man who boils his pot every day. One, two, or at most three dishes a day, are full proof of this horrible offence. To meet and destroy this objection, the pledge referred to was given—given by the house to the extent of a silent acquiescence, and on my part, with the more gratification because my lot had been severely to feel the lack of means in obtaining my own education. I rejoiced in the prospect of contributing my aid to the rescue of so many youths of promise from ignorance, and possibly from vice. These youths by alternate labor and study, might cultivate alike the farm and their minds. Daily uniting science and experience in all that concerns husbandry, with the mechanic arts, at the end of their term they would go out as shining lights, imparting their knowledge to every portion of the entire commonwealth. Again, the whole youth of the state educated at the University, would have the fairest opportunity of becoming skillful agriculturists.

What can work a more disastrous result in our agricultural interests than the condition of thousands of our young men succeeding to the management of their patrimony, almost universally consisting of lands and negroes, and yet, not unfrequently, more ignorant of what they have undertaken than the negroes themselves. The expression you may say is strong, if not harsh—be it so—is it not true?

Another scheme for aiding agriculture is the creation of an agricultural board—recommended by the example of the several states—a board to be composed of members distinguished for zeal and success in the pursuit. We have long been taunted that from our dispersed situation and repugnance to leaving our homes, we were incapable of concert—and hence our fleece became the booty of the first spoiler. By such a body as the one proposed, our wants might be made known, and our interests cherished and protected.

It is proposed also that an intelligent man, adequate every way to the duty, shall be employed for a year or two, whose duty it shall be to seek out the best examples in this and our sister states, of successful cultivation and good management in whatsoever is excellent in the whole circle of husbandry, and to report thereon in detail—on the soil, climate, mode of cultivation—kinds of crops—quantity of seed sown—the arrangement of farmpens—the best mode of making manure, and its application when made—and in short, whatever might be useful. Will not every candid man admit that such a duty, well performed, must yield infinite advantage—by important suggestions—by settling principles, removing doubts, and in a thousand ways contributing to the benefit of agriculture.

Well! what is the difficulty in attempting to achieve these good things? The expense, a few thousand dollars—five thousand to begin with, and two or three thousand annually thereafter—in so far as agriculture alone is concerned. And can it be possible that so small a loan will be denied to us, the tillers of the earth? What, let me ask, has ever been done for us? Yet we have paid ninety-nine hundredths of the whole amount expended in the erection of the University, and whatever has been paid into the Literary Fund. We do not object that ample provision has been made for other sciences. No, we rejoice in it—but we do complain that this most important of all has been entirely neglected—yes, the most important, and of unusual concern. If in any country agriculture languishes, the effects are felt through the whole social body. It is the infallible barometer by which to test the prosperity of every state. In asking therefore for a share of the public patronage, we ask not for ourselves only, but equally for the whole community. If therefore these necessary measures required fresh burdens, who could object, if we the payers require it. But fortunately, these are unnecessary. A large annual surplus in the Literary Fund, exceeding $20,000, is known to exist, and daily increasing. There seems then to be a peculiar fitness now in giving us the tillers of the earth, a portion of this surplus, to be expended in establishments full of so many advantages to husbandry.

I fear I have fatigued you by appropriating so large a portion of your time, and more than comes to my share. I will conclude, therefore, by saying that we are here from no political sect or party, and that our whole and sole object is to aid in arresting, if possible, great and growing mischiefs. We have met together to exchange greetings. Among those who, unseduced by the spirit of foreign adventure, have determined to abide by the fate of Virginia—be it good, or be it bad—having for our motto, "Don't give up the ship." We have come together to endeavor to rouse the sleeping energies of the commonwealth—and more especially would we invoke our young men to be up and a doing—to whom we would recall the recollection of what Virginia once was—when her star was culminating to the zenith—fed by the pure glory of a Henry, and a Washington, and a long list of illustrious names, occupying the fairest pages of history. What though that star may now be on the wane—her honors humbled in the dust, and none so poor as to do her reverence—yet let them not despair. A country once so fruitful, must have the faculty of reproduction. And, finally, we have come to invoke the legislature to suspend for a moment, the fury of party warfare, to remember their country, and to fulfil the high trust to which they have been called, by adopting a wise and beneficent legislature, which will make the crooked way straight, and the uneven smooth—to encourage the developement of the vast resources of the commonwealth, among which we place high on the list, its agricultural capacities, and to receive as their reward, the gratitude of all coming time.

From Roberts' Silk Manual.

ON THE CHINESE MULBERRY.

Sir.—Having seen many statements and suggestions in the public prints, that the Chinese Mulberry, *Morus multicaulis*, was not as hardy as the white mulberry; that it would not bear the extreme cold of our winters, &c., I deem it proper to state my own observations on the subject. I was the first person south of New York, who had the Morus multicaulis. It was sent to me by my old friends, Wm. Prince & Sons, in 1828, in a collection of seven other varieties of mulberry. It was not then known by its present name, but was called the Phillipine Island mulberry, and I believe was received by the Messrs. Prince direct from those Islands. About a year after I received it, accounts were received from France of the receipt of the Morus multicaulis, and of its great value for feeding worms. On examining my trees, I at once found that my Phillipine Island mulberry was the Multicaulis, and immediately commenced feeding my silk worms with it; and from experiment ascertained the truth of all the French had said about it. From that time to this I have continued to urge upon all the propriety of cultivating this, in preference to the white mulberry. Its advantages are—it is *fully as hardy* as the white; one pound of its leaves contain as much nutritive matter as a pound and a half of the white; the silk made from it is of a finer texture and more lustrous; its leaves are so large that a pound can be gathered at half the expense and trouble that a pound of white mulberry leaves require; it can be cultivated with infinitely more despatch than any other kind. These are all great advantages, and I am so well convinced of the correctness of this statement, that I do not hesitate to say, that within ten years no other mulberry will be cultivated for feeding silk worms; simply because those who feed silk worms upon white mulberry leaves will not be enabled to compete with those who feed on Morus multicaulis, and they will be either compelled to abandon the silk business, or adopt the Multicaulis for feeding. In relation to the hardiness of the Morus multicaulis, I have to remark, that I have cultivated it for *seven years;* never protected it in any manner whatever, and never lost a tree by the cold of winter or any other way. I had fifty young trees in my garden last winter, and not even a bud on the extremity of the branches was injured. It is true, about 50 yards distant, my dwelling house stood; there is a grove of oak trees, and on the north, 50 yards west from where the young trees stood; and the garden has an exposure to the south with a gentle declination. But my residence in the winter of 1821—2, was very different. It was on a farm four miles in the country, in a north-east direction; the situation at an elevation of 300 or 400 feet above tide water. There my Morus multicaulis had an open exposure to the north-west wind; yet none were injured. During the whole time I have had the white mulberry of various varieties, and have observed that they were all equally hardy—none more so than the Multicaulis. I have seen the young unripened wood of all the varieties destroyed by the winter, and was very early led to adopt measures to guard against it, and now I never lose a bud.

None but the young trees are ever injured by winter, and all we have to do is to give them such a start, as to enable them to ripen their wood previous to the approach of very cold weather. I raise all my trees from cuttings in a hot bed. About the 1st of March I make an ordinary hot bed like those used for raising cabbage plants; then I take the young wood of last year's growth, and cut it into pieces about two inches long, merely leaving a single bud on each; these pieces I stick into the hot bed three inches apart in a slanting direction, the upper end inclining to the north, and burying it so that the point of the bud is barely seen at the surface of the earth: sprinkle the bed with a watering pot, and put on the glasses; keep the bed properly moistened by watering every day, and throw matting over the glass at night, and in the middle of the day, to protect them from frost and hot sun. By the middle of May, the plants will be four to six or eight inches high, and may then be transplanted to the place they are to grow, like cabbage plants, watering them once a day for eight or ten days, if the weather is dry; they will be found to be well rooted, and will grow four to six feet the same season, and will ripen their wood so that the ensuing winter will not injure them. After the first year I have never seen any of them lost by winter, except in some extra cases, and in these cases the white mulberry has suffered, and even the native mulberry, fully as much as the Multicaulis. Last winter, a white mulberry tree, seven or eight years old, in the western part of the city of Baltimore, was killed to the ground, while my Morus multicaulis, not a quarter of a mile from it, and north of it too, and in a higher situation, was not injured.

In fine, sir, I am in no way interested now in the business of raising mulberry trees or silk, so that I can be influenced by no mercenary consideration in giving my opinion as above, and therefore the more dependence may be placed on these suggestions. The manner of propagating as above described, is my own discovery, and has been practiced by me for four years with invariable success. I would earnestly recommend it to all who are preparing for the silk business. I would also mention, that in 1832 I had fruit on one of my trees, which furnished good seed, from which I raised several trees, which were exactly like the parent tree. The seedling trees grew so slow, however, and the seed bed was so troublesome to keep clean of weeds, that were my trees to produce ever so much seed, I should never use it, trees being so much easier raised as above from cuttings. The Morus multicaulis is evidently as distinct a species as is the alba, rubra, nigra, &c., and its seed therefore produces its like, the late publication in the eastern papers to the contrary notwithstanding. I suspect the seed obtained from China, and distributed in New England, was more or less mixed with other kinds. The fruit of Morus multicaulis is black, small, (less than the white,) of a pleasant, acid taste; the juice stains the hands first deep purple, and when exposed to the air very black, requiring the acid of chloride to take it off; hence I infer that it will make a handsome dye.

Very respectfully yours,

GIDEON B. SMITH.

ON THE USE OF MARL AS MANURE.

BY M. PUVIS.

Translated for the Farmers' Register, from the Annales de l'agriculture Francaise, of 1835.

Introductory remarks.

The last received number of the *Annales de l'agriculture Francaise* has brought this Essay so nearly to its conclusion, that we have been enabled to form an opinion of the work, and to decide on giving its translation to the readers of the Farmers' Register. We have also recently obtained from Paris the original *Essai sur la Marne* of M. Puvis, a volume of 190 pages, published in 1826. The later publication of 1835 (though not so called) is a second edition, much abridged, and entirely changed in its form, and still more so in language; but is, on some heads, more full; and whenever they differ, the latest work may be supposed to best exhibit the author's present views, corrected by longer investigation and experience. The older work also embraces many points which the author again treated in his essay on the use of lime, which was given in an earlier part of this volume of the Farmers' Register, and of which the following essay on marling, is a continuation. These considerations of course have induced the choosing the latest work, although, there were some other grounds for preferring the former for the labor of translation, as it seems to have been more correctly written and printed, and would have caused less difficulty. M. Puvis is a voluminous writer, and, it seems, a hasty and careless one, and many of his sentences are so badly constructed, as to cause much difficulty to decide on their meaning—and this is increased by the general very faulty printing of the *Annales* as it regards punctuation, and the division and separation of sentences. In this latter respect, we have been compelled to make alterations in almost every sentence, to prevent a general and most awkward departure from every thing like English construction. But to the author's words, we have aimed to adhere as closely as possible. The sentences which caused doubt in no case, were important to the subject—and however defective may be the translation in point of form and of language, it is believed that the matter has been correctly given, and that the author's facts and reasoning retain all their original force. Some passages of the *Essai sur la Marne*, which give more full information, will be placed among the notes to this translation; and the entire chapter on the "Healthiness produced by marl," will be given, either instead of the shorter and less satisfactory portion of the later work on that important part of the subject—or hereafter, as a separate article. This substitution, and the omission of the author's process for analyzing marl, (which is much less perfect than several other modes described in the Farmers' Register, therefore would be of no value,) are the only liberties which have been taken with the text. Some additions, which seemed necessary to the sense, are enclosed between brackets, so that if erroneous, the author may not be made responsible. The marginal notes throughout, are our own. The remarks which we submitted as introductory to M. Puvis' essay, *On the use of Lime as Manure*, (p. 359, vol. 3) are mostly applicable to this continuation—and the views there stated will generally also limit and direct our comments through the course of the following essay. But though (as before) we shall refrain from expressing dissent in every case of opposite opinions being entertained, still there will be need for our marginal comments being made more full.

The erroneous theoretical views of M. Puvis, as presented in his essay on lime, of course attend this continuation. It is probable also (from the nature of things, and not from any fault of the author,) that his statements of the effects of marling are less to be relied on for correctness, than those given by him of liming. For both, he had to depend on the testimony and opinions of other persons—and of course was liable to be misinformed: but this danger was much greater as to marl, because the labors were more widely extended—in some cases were of very ancient date—and generally were executed by a class of farmers more ignorant, and less observant, than those who are engaged in liming—a business which requires, and usually engages, the attention of more wealthy and intelligent farmers. We have entire confidence in M. Puvis, when he states facts on his own knowledge—but not in what he has learned from others, especially when the supposed results are opposed to the theory which we believe to be sound.

Though the value of the following essay is not equal to the author's first portion, on the use of lime, and though, it is obnoxious to many charges of error, still it is well worth the attention of every farmer who desires to use calcareous manures of any kind. M. Puvis is not guilty of the gross omissions, or errors on the subject, which we have elsewhere charged on the writers of Great Britain.* He does not like most of them, leave his readers in doubt as to the chemical composition of the manure he speaks of, nor of the soils on which are they used; and, either directly or indirectly, we can generally know what is the true nature of the operation, chemical or mechanical, of the marlings which he describes. The quantities and the strength of the marl applied, and the value of the effects produced, are stated much more fully and particularly than in any other European work that has treated of calcareous manures. These matters are of great value, as they will often enable a reader to draw correct and useful conclusions, from statements and opinions in which the author himself may have been mistaken.

We learn from M. Puvis that the earth which he correctly calls marl, is a deposite of fresh water. In that respect as well as in others, it differs from what is called marl in Lower Virginia—which in fact is the salt water formation called *crag* in England, and *falun* in France, and not called *marl* in either country. However, the carbonate of lime contained, constitutes the value of both, as manure—and the name is of no account, if the composition and properties are properly understood. But this difference is important in another point of view. Valuable and extensive as are our beds of fossil shells, (which in lower Virginia have usurped, and monopolized the name of marl,) the formation is limited to the tide water region, or the space between the Atlantic, and the falls of the rivers flowing into it. But the proper marl, as yet almost unknown to scientific research, and altogether to practical use, *may* be found in other regions, and may enable improvements by calcareous manures to be greatly extended and multiplied. M. Puvis thinks that the marl formation will be regularly found at some depth beneath the argilo-silicious surface-soil, of such peculiar and base qualities. But whether he is right, or not, as to this indication of the presence of marl, it is certain that geology can furnish sure guides to its position and extent, if indeed this precise formation is to be found in this country.—Ed. Farm. Reg.

* See Essay on Calcareous Manures, pp. 35, 82.

Composition, localities, and varieties of marl.

Marl is a compound of carbonate of lime, and of argil more or less mixed with sand. We have said *compound*—we might perhaps have said *combination*, as that of alumine and silex in argil; for no mechanical means, as suspension in water, will serve to separate the carbonate of lime from the argil.

The formation of marl, in its many varieties, would seem to have immediately preceded the great argilo-silicious formation, which we believe to have covered all the surface, and which, is found every where under different names: here, under the name of *white land* [*terrain blanc*] there of *blanche terre;* in the south, of *boulbenne;* in the north, of *terre clytre;* and *terre à bois;* and in the basin of the Loire, *of the earth of Sologne.** Almost every where, upon the borders of the *plateaux* which these lands of the great alluvion present, marl is met with in *affleurmens;* and under the bed which forms these lands, it is found at greater or less depth. Thus, in Sologne, under all its borders, and in the greater part of the basins which furrow its surface—in Bresse, under the *terrains blancs*—in the environs of Toulouse, under the *boulbennes*—in Puisaye, under its *white earth*—and in Normandy under its cold lands—marl is found, as if placed by a benificent hand, to give to these soils the activity and the means of producing, which nature had not bestowed on them.

Marl presents itself under many aspects, and in many varieties, and compounded of very different proportions. It is more or less rich, according as it contains more or less carbonate of lime: its consistence varies also according to this proportion: it becomes harder as the quantity of carbonate of lime increases up to 70 per cent., when it begins to become stony. Over 80 per cent. it ceases to be marl, belongs to a different formation, and is no more found under the argilo-silicious bed: it crumbles with more difficulty, and becomes a marly calcareous stone, good to make hydraulic lime, but which slakes sometimes so badly, that it is necessary to pound it, to make use of it as manure.

Marls are met with in powder, which contain a very large proportion of carbonate of lime: but nature does not offer them commonly, but in banks or deposites, [*sacs*] of little extent.

It is remarked that the fertilizing power of marl

* In a note to the *Essay on the use of lime*, (at p. 363, Vol. III, Farmers' Register,) we ventured to describe what were believed to be the peculiar characters of the soil called by the author "argilo-silicious," and known in different places under all the above provincial names; and, though with only indirect evidence and conjecture for guides, we have since found that the views then hazarded were correct. We have lately obtained the numbers of the *Annales* for the year 1833—and there, among other pieces of M. Puvis, find a more full description of these ungrateful soils, confirming fully our first impression.

increases with its depth; commonly its shade becomes more near to white, as the proportion of carbonate of lime is augmented.

Marl may be more or less compact, and retain more or less water, according as the argil which it contains encloses more or less of sand—or of sand in grains more or less fine: for, according to the experiments of Schubler and of M. de Gasparin, fine sand retains almost as much water, and gives to its compounds almost as much tenacity, as argil does.

The color of marl is very variable: however, stony marl is almost always white. Earthy marl, though taking all colors, is most often gray.

These differences of composition and of appearance, have caused marl to be divided into argillaceous (or clayey,) sandy, and stony marl—terms a little vague it is true, but which, however, are useful in practice.

Marl seems to be, in most cases, a formation of fresh water; a great number of marls, of various kinds, colors, and composition, in Ain, Saône and Loire, Isere, Provence and the stony marls of Yonne, have presented to us a great variety of shells, which have been recognized as belonging to fresh water formations.*

Searching for marl.

The importance of marl in agriculture ought to cause it to be sought for wherever it may be of use, and almost always it is found near the surface of the ground. The plants, colt's foot (*tussilage*,] rest-harrow [*ononis*.] sage, yellow clover, brambles, thistles, cow wheat [*melampyre*,] commonly indicate the soils under which marl is found at little depth. The digging of ditches, and of wells, often expose it: more often it is found in grubbing upon slopes. Beds of sand also announce its presence, as they almost always cover or underlie the marl.

If none of these signs indicate it, marl may be sought by boring in the lower parts of the land. But deep borings require heavy expenses: the drawing out of the marl which they might discover would be effected only at great cost—and generally, springs of water would be met with, which would oppose all economical labor. However, when water does not injure the work, drawing marl from great depths is much more economical than the transportation from distant places. Extracting marl from great depths is not a novelty in France. Pliny speaks of marl which was drawn, in Gaul, from more than 100 feet in depth; in Normandy, it is still obtained in this manner: and near Lisieux, some marl-pits are more than 70 *brasses*,

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* As the "marl" described above, though agreeing in its most important chemical and fertilizing properties with what is called marl in Virginia, is yet very different in appearance and in its localities, it may be useful to add to this account, something from the more full account given in the original *Essai sur la marne*.

"Marl is found in countries of the tertiary formation, and particularly in the basins formed by calcareous chains, and most often at a little distance from the mountains. It is placed commonly upon the slopes of hills of no great elevation, [*collines*.] in hollows, or in layers, either horizontal or inclined. It is more rarely found in the plain, and when met with there, it is placed at a much greater depth in the earth.

"There has been much discussion as to the origin of marl; but it shows itself under aspects so different, in forms and in texture so varied, that it has been impossible to assign to it a common origin."

After describing the several kinds of marl, as in the text above, though more at length, the author adds—

"Lastly, we have to mention shell marl—which is again divided into two classes, according as the remains which it contains, are derived from the sea, or from rivers. This marl is, of all, the most precious: it would seem, more than the others, to contain the principles of [alimentary] manure, and perhaps, some remains of parts not yet destroyed of animal principles.

"We shall class as shell marl the *crag*, which in Suffolk, and combined with dung, renews without cessation the fertility of the country which uses it; the *falun*, which in Touraine fertilizes whole cantons; and in short, numbers of other beds of shells not bound together by a cement, and which under different names in France, are used as manure with much advantage."

This is precisely the description of the marl of Lower Virginia, and this kind the author never means when he speaks elsewhere of marl simply.

"It appears that the examination of the shells which are often met with in the earthy marls, may offer to geologists valuable information upon the formation of marls themselves, and upon that of the countries in which they are found." The following known shells, are afterwards named in a catalogue, which will be given in an abridged form. The names of the shells, may possibly furnish useful indications to those investigators who are better informed on this part of the subject. Of these marked with a star (*) similar living species are found still in the country.

In a marl sent from St. Trivier--yellowish, compact, of homogeneous appearance, and coming to pieces finely and easily in water—

Land shell—Turbo elegans.

River shells—Helix fasicularis, Helix vivipara, * Helix tentacula, * Mya Pictorum.

In a marl from Cuiseaux, Saône et Loire—

River shell—Melanopside (of Lamarck.)

In a marl from Lenguy, in Yonne—

Land shells—* *Chassilie ridee* (of Lamark, and Draparnaud,) * Helix lubrica.

In a marl from St. Priest in Dauphiny—earthy, yellowish, very easy to melt in water—

Land shell—* *Ambrette alongée* (of Lamark and Draparnaud,) * Helix hispida.

In an analogous formation of marl, in the basin of the Rhone, between Meximieux and Montluel, the *Helix striée*, a land species, is found in great abundance.

M. Puvis states that among these, and among all the species of shells found in the marls of the basins of the three great rivers, Saône, Rhone and Yonne, there are no remains of sea shells. All seem to have been formed under fresh water. "But (he continues) as these marls contain land shells, often in great abundance, we must conclude, that the revolution which heaped up the marls, has been preceded by a time in which the land was not covered by water, in which the earth, producing vegetables, permitted the multiplication of the species of land shells which were found in these marls." *Essai sur la marne*, p. 8, to p. 24.

or 350 [French] feet in depth.* In such cases, the fixing a horse or ox to draw up the marl, may greatly diminish the labor.

In land where water is reached at but little depth, deep borings are useless, and a small auger will serve. It consists of a rod of iron, of 10 or 12 feet in length, steeled and properly shaped at the point. It is worked by a handle like that of a common auger, but which is raised and lowered at will, and is fixed, by the pressure of a screw, at any height desired.

The marl lies nearest the surface in the spots where the earth seems dryest—where the argilo-silicious soil is reddish, rather than gray. When it has been found, if not deep, it is preferable, to uncover it entirely: in this case, some veins of water ought not to prevent the extraction of the marl. Whatever is begun in the day, should be dug to the bottom by night: the water, during the night, fills the hollow dug in the previous day, and the next day, it is either got rid of, or another pit is dug by the side of the other, leaving a sufficient wall to keep out the water, until the last digging also reaches the bottom.

When marl is found, or what is believed to be such, (for no two things appear more alike than earthy marl, and certain kinds of plastic clay,) its nature may be ascertained by touching it with nitric or muriatic acid, or even strong vinegar. A movement of effervescence announces marl; but it is nothing more than clay, if the acid spreads through it without causing it to swell. Again—if a lump of dry marl is thrown into water, there takes place immediately a slight ebullition, its particles separate as if by mutual repulsion, and they fall to the bottom of the vessel in a kind of pap. This is another of the specific characters which marl communicates to soil, in a high degree.

All these characters do not meet together in the same degree in argillaceous, and in stony marls. The latter has often need, after being laid in the land, of the aid of freezing, and even of being broken by hand, to be crumbled enough to produce its proper effects.

Magnesia is sometimes met with in marl, but more rarely than in limestone: the effect of magnesian marl on soil, is to be avoided, as that of magnesian lime.† To know its presence, it is necessary to recur to the process indicated for lime.‡ It is also to be remarked, that the water which covers the pits whence magnesian marl has been extracted, like that which stands in the bottoms of quarries of magnesian limestone, remains whitish; while that which covers marl, or limestone, not magnesian, is quite transparent and pure.

Of the ancient date of the use of marl.

The use of marl in our country is very ancient. Pliny speaks of its being used in Gaul, in England and in Greece: he has even preserved the Gaulic names given to its varieties, the only remains, probably, that are known of the language of our ancestors. Varro, the agriculturist relates, that when in Germany at the head of the Roman legions, he traversed countries upon the borders of the Rhine, the inhabitants of which manured their fields with a white fossil chalk. Since, it appears that the usage has continued in some places, but much more in England, than in France. In France there were no remains of the practice, except in a few provinces. However, Bernard Palissy, Olivier de Serres, and even La Bruyère the moralist, eulogize its effects.*

The effects of marl, being similar to those of lime, have furnished grounds for similar opinions and facts. Marlings have ceased in places where they had been much in use; and in some, indeed, the prejudice was established that marl "enriched the fathers and ruined the sons," and its application was forbidden by the conditions of the leases. In short, marlings, like limings, had become rare.

All these facts may be explained. Marl and lime act upon the soil by the same agency. When either by one heavy dressing of marl or of lime, or by repeated dressings of one or the other, the soil has been supplied with a sufficient proportion of the calcareous principle, new applications cannot produce any benefit, and may even cause injury to the land. Both induce a great degree of productiveness: but for this fecundity to be sustained, it is necessary that a quantity of putres-

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* The French foot exceeds ours (or the English) as 1.066, to 1.000—therefore, the marl-pit named above was 373 one-tenth English feet deep.

† The magnesia in burnt limestone, being pure, and caustic, may well be hurtful to soil, and yet the mild or carbonated magnesia, as presented by nature, might be beneficial. We know of no proof of the carbonate of magnesia being injurious to soil—and on the contrary, would suppose it to be an ingredient of much value. We found, by chemical tests, that a specimen of the alluvial soil of Red river in Louisiana, so celebrated for its fertility, contained carbonate of magnesia—and we have since seen stated, in another publication of M. Puvis, himself, that the soil on the borders of the Nile, of still more noted fertility, has been found to be magnesian.

‡ See page 385, Farmers' Register.

* "Pliny is the first and the only Latin author who wrote on agriculture who speaks of marl, [as being used to enrich lands, in Gaul and Britain.] Cato and Varro do not mention it. Columella, it is true, speaks of the mixture of earths—but only of sand, to mix with clayey soils, and of clay, with sandy soils. He commends these mixtures very highly; but nothing that he says indicates either marl or its effects. Palladius, who wrote long after these, and after Pliny, is alike silent as to marl: its use then was neither practised nor known in Italy, nor even in Spain, of which country Columella was a native. Gaul then could not have derived the practice from the Romans.

This practice, at that epoch, appeared to have been long established. They drew the marl, says Pliny, from pits of more than 100 feet deep, and having galleries, [or horizontal diggings extending from the perpendicular pit,] as in mines. It seems then, that they made, for the execution of this improvement, much greater sacrifices of industry and time, than is done now—which would prove that agriculture was in a flourishing condition in our country at that early epoch, and consequently, that it was not covered with forests, and with Druids, as opinion seems to have established—and in short, that civilization, which always follows the progress of the arts and of agriculture, was then much more advanced than is believed." *Essai sur la Marne*, pp. 15, 17.

cent manure should be given to the land, proportioned to the products carried off—that the soil should not be overburdened with exhausting crops—otherwise it loses its fertility, and especially that portion which it had at first derived from the marling. The blame is charged to the marl, when it ought to be laid upon the greedy and injudicious cultivator.

Marling and liming have been kept up in England, when they had almost ceased in France. This remarkable fact can also be easily explained. In France, the general system of husbandry is especially designed to produce grain crops; and they have profited by the new powers given to the soil by these manures, to raise much grain without thinking of returning a proportional quantity of manure, and consequently, the soil has been overburdened and fatigued: new applications of the same manures have had no effect in renewing productiveness, and marl and lime have been abandoned—except in such provinces as Flanders and Normandy, where agriculture has given putrescent manures to the soil, by reason of the nature of its products.

In England, the system of agriculture was generally productive of putrescent manures. Marl and lime have increased the forage crops, as well as grain, so that the soil, instead of being exhausted by marl and lime, is enriched; and they have continued to use the means which gave the first impulse to fecundity.

The soils which marl suits.

Marl acts by the carbonate of lime which it carries to the soil—for the argil alone produces none but a mechanical effect. The smallest quantity of the calcareous principle is felt in a soil which before contained none; but on calcareous soils, its application is more often injurious: it does not then suit any soils but those in which that principle is deficient. We have seen that such soils are of great extent in France, and that they are met with almost every where. The analysis of the soil is doubtless the most sure means for knowing their composition; but this process is opposed by difficulties beyond the control of the farmer. The exterior characters, the effervescence in acids, the facility of its melting down in water, are means of judging of soils in this respect: but, without doubt, the application of a few loads of marl to the soil, before the sowing of autumn or spring, would serve to decide the question better than any other mode of trial.

Marling in various countries.

There is still more of variation in the rate of marling than of liming. The origin of marling, in most countries, was due to chance: the earth raked up in some places, and from ditches and wells, has been spread upon the soil, and has sometimes produced an unexpected fertility. If the cultivator is active and enterprising, he treats in like manner his other grounds—his neighbors are inspired with confidence in the operation, and marling is extended. But still the procedure is regulated, as it was first commenced, by chance merely—and the dressings are almost always too heavy, because the cultivators cannot believe that they can give to the soil too much of this fertilizing substance, which costs them so little.

We do not find between the English and French marlings the same disparity as between their limings, as to the amount of the doses given: but what we ought especially to imitate of the English practice, is the association of putrescent manures with marl, a usage but little known in France, but frequent enough with the English farmers, especially for second marlings. Their dressings are more or less heavy, according as they are designed for the first or the second marling: the first make a layer of from four to five lines of thickness over the surface, and the second of one to two lines at most.* The dressings succeed each other every 15 or 20 years. They vary in quantity according to the consistence of the soils, and the richness and poverty of the marl. In some places, they marl the pasture lands, and the meadows not watered. In the parishes where both marl and lime are used, they apply the former to the grass lands, and the latter to increase the grain crops. Marling has changed the face of many counties: Norfolk, formerly covered with heaths and wastes of sand, is become, in consequence of marling, the region of pattern agriculture—the best cultivated and most productive in England.

A stony marl, under the name of limestone gravel, fertilizes a great extent of land in Ireland: it has been put on in such heavy dressings, that it has entirely changed the nature of the soil, and will no more need to be repeated.

In Germany, marlings are less ancient than in England; and there, they have excited much controversy. The farmers have profited eagerly, some say imprudently, of the new productiveness given to the land: they have especially, in Holstein, and its neighborhood, produced much rape. From this course, some agricultural writers have threatened exhaustion; but already more than a quarter of a century has passed away, and the productiveness of the soil is still sustained.

The marlings in Flanders are of as ancient date as their limings: they have there become a regular operation of husbandry, and amount to 22 two-horse cart loads of a very rich stony marl. This dose is equal nearly to 500 cubic feet to the hectare, covers the ground about two-thirds of a line, and forms an hundredth part of the tilled depth of the soil. The *arrondissements* of Dunkerque and of Hazebrouk, use marl upon two-thirds of their surface, and the other *arrondissements* use it in less quantity, because they apply more lime, and because they are obliged, in part, to draw their marl from the neighborhood of St. Omer. It costs them from four to six franks† the cart load, because it is often drawn from many leagues distance, after a transportation by water. They renew the marlings every twenty or thirty years. This marling costs thrice as much as the liming upon lands altogether similar—that is, from four to six franks the hectare, and for each year on an

*Twelve lines make one inch: but as before stated, the French foot, and of course its parts, exceed the English (and our) measure of the same names as 1.066 to 1.000.

† The frank is about 19 cents of our money.

average, whilst the liming does not come to but from $1\frac{50}{100}$ to 2 franks—which doubtless shows, for these soils, a great prejudice in favor of marl.

The marlings upon the argilo-silicious plateau of La Puisaye (Yonne) are made with a stony marl, and they are heavy: they amount to 3000 cubic feet the hectare, and form a layer upon the surface of four or five lines thick, of marl which contains 80 per cent. of carbonate of lime. This lavish use is explained by the circumstances of the marl being found almost every where under the soil, and of its containing so much carbonate of lime, that it is very slow in coming fine—many years being scarcely enough for that end. Marling, in this country, had taken place at some points, from time immemorial: likewise, the doses there are but a third or a quarter of this quantity: they have not begun to be extended but since forty or fifty years. Now, the surface is almost every where entirely marled, and the soil has been tripled in value, wherever it has received this improvement.

The marlings of the environs of Montreuil, in Picardy, cover the soil one line in thickness nearly, of a stony marl, which is obtained from under the soil itself, by pits. This marling, which is renewed every twenty years, costs 20 franks the hectare.

In nearly the whole extent of the basin of the Seine and its tributary streams, there is found, at greater or less depth below the argilo-silicious surface soil, a white stony marl, more or less friable, and which seems entirely similar to that which is found under the *plateaux* of the basin of the Yonne, as are those of the Oise, the Eure, and of the rest of Normandy. This marl is very rich, containing from 60 to 80 per cent. of carbonate of lime, is applied in the department of the Eure at the rate of 50 to 100 hectolitres to the hectare—which makes a layer upon the soil of one-third of a line, to a line and a half in thickness.* The bed of marl, which is sometimes found at the surface, is worked in the neighborhood of Lisieux to the depth of 350 feet. The marlings are repeated every 15, 20, 30, or 40 years, according to the need, and the nature of the ground. In some places, they have not been able to reach the stony marl; they then content themselves with the earthy marl, of which the doses are heavier, and repeated more often.

Marling appears to exist in Normandy of various and very ancient dates. It is seen recommenced in places where there was no tradition of former applications, but where the existence of old pits supplied the absence of memory—and which perhaps have not been disturbed since the time of Pliny. It then was probably applied to most of the soils which marl suited, and the greater part of the applications which are now made are second marlings, or returns to marling after its cessation for many generations—which will explain the small doses. In some places, lime, and manures of the sea [*engrais de mer*] cause marl to be forgotten; but the soil profits by the alternation of manures, as well as by the alternation of crops.

Marl is little used in the neighborhood of Paris: however, before reaching the bed of stony marl, there are found, in the subsoil, sandy marls, which I have seen used with success by M. Perrault de Jotemps upon the sandy soil of Croissy. In the neighborhood of Grignon, I have seen fields covered with stony marl. The great abundance and low price of putrescent manures cause the need of marl to be less urgent: but it is very certain, that there, as much at least as elsewhere, in much of the land, marl would add to the quality and abundance of the crop.

The marlings of Isere may furnish us with useful lessons. They are made upon silicious gravel, with a gravelly marl, which belongs to the subsoil. This soil makes part of the great alluvion of reddish silicious gravel, which covers three-fourths of the ground of the basin of the Rhone, and which is composed of the rolled ruins of the primitive alps, connected by a reddish earth. The marlings, directed by hazard, and made with but little labor, are very heavy. The soil is covered with a layer of four to five lines, of a sandy marl, which contains from thirty to sixty per cent. of carbonate of lime. This quantity of marl, thrown upon an arid soil, doubles its products at least. The cultivator, who, almost without manure, made every two years a crop of rye, amounting scarcely to thrice the seed, has reaped, during ten or twelve years of the marling, eight for one of wheat. However, the harvest has gradually diminished, and it is now, after forty years, reduced to four for one. Those who have not seen the crops before the marling, complain of the exhaustion of their soil; but the gross product is still double of what it was before. As for the rest, there are found here all the circumstances which ought to lead to exhaustion: heavy dressings of very rich and sandy marl, upon a soil, arid, gravelly, and having little consistence; a cultivation without forage [grass and root] crops, and a succession of exhausting crops almost exclusively. It has also resulted, that, upon the parts the most dry and arid, which could scarcely support any tree, not indeed even shrubbery, the ground has become more dry—and that, though producing winter grain in double the ancient amounts, it is true that for the spring crops, and the clovers especially, there is still more to fear from drought. The proprietors have under their hands an argillaceous marl which would suit their soil admirably, and would give it the consistency and connexion which it wants—but they do not use it, because they do not find it strong enough. Notwithstanding, since the marlings, the country has been at least doubled in value, in products, and in fertility.

The operation of marling—which might be spread with such great advantage over at least a ten-fold extent—from Geneva to the sea, upon the Bugey, the Valbonne, the plains of Valence, the *garrigues* of Comtat, the plain of Crau—scarcely has begun to extend beyond some cantons of the Isere; and the trials, attended by success in the Ain and Drome, have been but little followed elsewhere.

The marls of the great argilo-silicious plateau which cover a part of the department of Ain, of Saone and Loire, and of Jura, contain from thirty to forty per cent. of carbonate of lime. Their efficacy has been revealed forty years ago, by a cultivator of Ain. The ancient practice there, of improving the soil with large quantities of

* There is evidently a mistake in one of these numbers, though it is not important. Most probably, the last should have been two-thirds of a line.

earth carted upon the surface, has induced the cultivators to apply marl very heavily. It was at first laid on fifteen to eighteen lines thick over the whole surface, a quantity equal to that of the earth which had been usually applied. This dressing was at first reduced by a third, and afterwards, by a half—the balance being still an enormous quantity applied, since, in that country, where the ploughing is not more than three inches deep, such a marling forms a fourth, or perhaps a third of the tilled surface-soil. The cultivators, neighbors of Saone and Loire, have imitated these marlings, but without adopting the dose. They do not give to similar soils but a quarter of this quantity, of a marl which does not often contain more than thirty per cent. of carbonate of lime; and the marlings are less durable, doubtless, but are as productive as those of Ain.

Heavy dressings of marl have done harm in some places. In very clayey land, the tenacity of the soil has been increased, and the labor of its tillage; buckwheat and potatoes have thereby been less productive: light soils, and sands, without being much improved in their consistence, have been rendered too hot, and the growth of wild poppies and rhinanthuses was increased.

We find in Sologne a striking lesson in the improvement of light and sandy soils by marl. The dressing, of a marl similar in it's composition, and in every appearance to that of Ain, is from 2[illegible] to 300 cubic feet to the hectare, and this covering of two-fifths of a line in thickness, suffices to fertilize the soil for ten years.

[To be Continued.]

EXTRACTS FROM THE THIRD REPORT (OCT. 1835) OF PROFESSOR G. TROOST, ON THE GEOLOGICAL SURVEY OF TENNESSEE—MADE BY ORDER OF THE LEGISLATURE OF THAT STATE.

On the marl of Tennessee.

In regard to the second object of my investigation, of the extent and qualities of *marl*, I beg leave to state that I have not as yet been able to ascertain the exact limits and extent of this valuable mineral: I have, nevertheless, ascertained that it exists in inexhaustible quantities. I found it in some places near the western boundary of Hardin county; it shows itself above ground in several hills near Coffee. It pervades the whole of M'Nairy county: and there seems to be no doubt that it forms the subsoil of Hardeman, Fayette and Shelby counties; as to the latter county I am not certain, it is, as yet, merely conjecture: nor am I able to fix its northern boundary, I know it extends to the north of Lexington and Jackson in Madison and Henderson counties, and I conjecture that it extends beyond Paris, Henry county.

In the southern part of the western district it lies pretty near the surface of the ground, and crops out at several places, which may always be recognized by the whiteness and barrenness of the ground, and the large shells, resembling somewhat the oyster shells, which characterize this kind of marl, and which are scattered over the surface.

The depth of the stratum is not yet ascertained, but I found some of the inhabitants who told me they had dug eighty feet for water and went not through the marl, and from these diggings, it appears that there exist two kinds of marl one white, more or less grayish, and the other blackish gray.

Marl, in the present fertile state of our country, may perhaps be considered as of no importance; but this state of things cannot last long; the astonishing increase of population in the west will soon bring our state on a level with our sister states in the east, and if we are not prudent in the husbandling of our soil, we will pay dearly for it. The farmers of Pennsylvania have been long aware of this, and they get, at a great expense, large quantities of similar and some much inferior marl from New Jersey. It is the same with those of Maryland. The legislature of that state, convinced of the importance of the use of marl, have, like your honorable body, also appointed a geologist, Mr. Julius Ducatel and his instructions, according to his last report, seem principally directed to ascertain the localities where this valuable substance may be found. It is therefore of importance that the attention of our farmers should be drawn towards that subject, that they should be made acquainted with the substance, with the places where it can be obtained, with the mode of applying it, and with its effects.

* * * *

The quantity of the most excellent marl which Tennessee possesses is inexhaustible. There seems to be no doubt that it is to be found in the greatest part of the western district. M'Nairy county, so remarkable for its sterility, abounds in marl, which, in several places, forms the surface of the country; I have traced it, as I have already observed, from the southern limit of the western district to the north of Lexington, and I have not yet ascertained its northern limit. It approaches the Tennessee river at some places, but in Perry county and farther north, it commences about 10 miles west of that river. I have not ascertained whether it reaches every where the Mississippi river. It forms, in some places, the surface of the ground, which, in such cases, is destitute of vegetation, and known under the name of *glade*, on which the characterizing shells, (oysters and gryphææ) may always be found.

Three kinds of marl are enumerated by naturalists, all of which are used for improving the soil, and some for building stone: they are called *argillaceous marl*, *calcareous marl* and *silicious marl*. Some naturalists rank among them a fourth species under the name of *bituminous marl* or *marlite*. Marl is also known under different trivial denominations. Treating this subject in a practical way it may be divided into *shell marl* and *earthy marl*. What English agriculturists call *shell marl*, is similar to the marl that is found in the state of Tennessee; the *earthy marl* is a different mineral substance. The color of the latter is various—white, black, blue, red—and its hardness is as various as its color, being sometimes soft and ductile like clay, sometimes hard and solid like stone. Shell marl is easily distinguished by the shells which always appear in it.

Shell marl is very different in its nature from clayey and stone marls, and from its effects upon the soil, is commonly classed by agriculturists among the animal manures. It is generally considered by them as containing an oily matter which is supposed not to exist in other marls, and to which its superior quality is attributed. As mineralogist, I must nevertheless confess that I do not know what is meant by this oil.

* * * * *

Since the time of *Bernard de Palissy*, the first who endeavored to explain the action of marl, till the present time, the opinions respecting this question have been much at variance.

Bosc, in his *Nouveau cours d' Agriculture*, distinguishes two modes in which the marl acts upon the plants, namely, mechanically and chemically, and says that marl is not a manure properly speaking, as is the opinion of many agriculturists, but that it is an *amendment* that only improves the soil without producing any food for the plants.

Argillaceous marl, according to that philosopher, acts mechanically, by rendering the calcareous or sandy soils, generally called light soils, more compact and susceptible of retaining longer the water and gases produced by the decomposition of vegetable and animal matter contained in the *humus* or vegetable mould.

Calcareous marl acts mechanically upon the *argillaceous soils*, or those generally called stiff loams, by rendering them more loose or giving them the property of being more permeable to water and to the roots of plants.

Both these species, the *argillaceous* and *calcareous marls*, act chemically upon the vegetable soil by means of lime, which has the property of dissolving a great part of the *humus*, and furnishes thereby a more abundant food for the plants cultivated in it.

To make this more evident we must state the experiments of *Theodore de Saussure* and *Braconnot*, from which it appears, 1st. That *alkalies* dissolve completely the *humus*, and that lime and limestone dissolve it partly. 2d. That the plants grow more vigorously in proportion as the *humus* is in a state of solution.

The latter result is besides supported by the numerous facts which were till lately inexplicable. These facts explain why the soil becomes steril when the marl forms the surface or where it is too near to the surface, as is the case in McNairy county. These facts also teach that it is more beneficial to use marl often and in small quantities than to apply it in great abundance; to use a small quantity on poor, and a larger quantity on rich soils; that it is advantageous to manure a poor soil before the marl is applied. In fine, these facts show the utility of the use of lime for agricultural purposes, and that calcareous marl and lime are also excellently calculated to improve soils which have been for a considerable time the receptacle of stagnant water, which must be considered as the greatest enemy to *humus*, as it renders it acid and astringent, as we see in peat soils which, abounding with vegetable matters from which water is not properly drained, become sour as it is justly said, and produce rushes and other useless and unpalatable plants. In such soils the lime of the marl neutralizes the acid, and acts at the same time upon the *humus*, and by these means abundant fertility will be restored.

* * * * *

Let us now turn our attention to the soils of the state of Tennessee. Although these soils are much diversified in their appearance, texture, composition and quality, those, nevertheless, which compose the surface, of the three counties under examination may be divided into two principal varieties, namely: into the *silico-argillaceous* soil (containing sand and clay) and the *argillo-calcareous* (containing clay and limestone) and their origin may generally be traced to the disintegration of the rocks which they cover, and to matter which is washed down from neighboring elevations, except in the low grounds near the rivers, some of which are still occasionally inundated, the soil of which, is generally a very rich alluvion.

The elevated levels, which, as may be seen in my geognostic description in previous reports, consist of sandstone, are covered with a slight silicious soil, whereas the lower situations, where the rocks are limestone, are covered with a soil which is more diversified and generally of an *argillo-calcareous* nature, or of a stiff calcareous loam.

The light soils which cover the high grounds, and which are generally considered as unproductive, would, in several parts of Europe, be regarded as tolerably good, and would remunerate the farmer for the labor he bestows upon them. Our Tennessean silicious soil is not to be compared with some of the silicious or sandy soils of the old continent—of those extensive heaths, some of which are composed of almost pure sand, and which, nevertheless, in some parts, are cultivated.* They are generally composed of a mixture of sand and clay, easily adapted to tillage, and no doubt excellently calculated for the culture of rye, tobacco and all kinds of roots, as potatoes, turnips, beets and similar plants. This kind of soil, nevertheless, as long as in our state stiff argillaceous land is ob-

* Any one who has visited the continent of Europe must be aware of this fact, and no where is it more perceptible than in the Netherlands, where industry and perseverance have changed the barren sandy plains into cultivated fields. Some of the extensive heaths in the vicinity of Arnheim, and those situated between Breda, Bois le duc and Antwerp, which thirty years ago were merely moving sands, where the winds alternately created and levelled hills and dales, are now mostly cultivated. Since the government of King William I. the numerous orphans and poor which were kept in charity houses in Amsterdam and other large cities, have been colonized on these barren districts, and by a proper training, this unproductive class of beings have not only become productive for themselves and independent, but they have rendered the ground they dwelt upon productive also, and thereby rendered a service to their country.

There is not, I believe, a country upon the globe where husbandry is brought to such a state of perfection as in some parts of the Netherlands. I spent a few years in that part of Flanders, between Antwerp and Ghent, in which the populous villages of Themst, St. Nicolas and Lokeren are situated. There is in no country more manual labor bestowed on husbandry than there, and that it is not unprofitable, we conclude from the wealth of the peasants, the comfort of the laborers, and the sleek appearance of the cattle; in fact, the whole country exhibits a garden cultivated on an extensive scale. All the land is in tillage. The cattle are mostly kept in stables, and fed with green food, cut and brought to them; by which means one acre of clover, lucerne or other artificial grass, will maintain five times as many beast or more, than an acre of the best pasture. But the great object is to increase manure, especially in a liquid state, which is carefully preserved in reservoirs without loss or waste till wanted for the land.

tainable, is not cultivated, and is still in several places covered with the primitive forests.

If we examine my geognostic map, we find these high grounds which are covered with the light silicious soil, colored red, and situated along the western side of the three counties. I have analyzed several samples of this soil: I have found much similarity amongst them all. When I discovered a stiff sub soil, which was mostly composed of a ferruginous clay or rather loam, I found the soil influenced by it and better adapted for cultivation and producing good crops of cotton. From several analyses which I have made of this kind of soil, I find it generally composed of about nine-tenths of silicious sand and one-tenth of finely powdered matter, which consists of

Alumina,	58.00
Silica,	30.00
Carbonate of lime,	2.50
Oxide of iron and manganese,	3.00
Vegetable matter,	4.00
Loss,	2.50
	100.00

Such was the average result of the analyses of those soils which have been for some time under cultivation. Those which never have been cultivated, where the samples were taken below the roots of the herbage which covered it, were often destitute of vegetable matter; while others which had been for upwards of twenty years tilled, were found destitute of carbonate of lime; this was the case with a soil from the farm of Dr. F. Stith, situated about a mile north from Big Harpeth river, in Williamson county, and which produced on an average about six hundred pounds of cotton per acre. In this soil I found also a greater quantity of fine pulverulent matter and no trace of manganese, while its color was that generally called mulatto color.

The soil of the bottom lands situated near the Harpeth river is remarkably fertile. I made analyses of some of these soils; they are generally of a black color, very light and porous and produce naturally ash, elm, boxelder, cherry, and scaly-bark hickory. A field which has been for about twenty-five years under constant cultivation and produced, on an average, ten barrels of corn per acre, it being not calculated for cotton, gave me four-fifths of fine silicious sand, and one-fifth of finely powdered matter which contained:

Silica,	54.00
Alumina,	35.00
Carbonate of lime, a trace of vegetable and animal matter,	9.00
Loss,	2.00
	100.00

The soil of the bottom lands of Duck river, in Maury county, is pretty much of the same nature, while those deposited by the Cumberland river are more tenacious, containing more clay and carbonate of lime.

The soils which cover the lower situations, as in the vicinity of Nashville, the greatest part of Williamson and Maury counties, and which are colored yellow on my geognostic map, are very fertile and well calculated for cotton; and though they sometimes fail in producing good crops of that product, this is rather to be ascribed to the season than to the soil. They always cover limestone, which contains a notable portion of insoluble matter which forms a stiff kind of soil, and the generality of this soil partakes much of the calcareous soil; nevertheless, I found, by the analyses to which I have subjected them, some that are entirely destitute of carbonate of lime. I analyzed one of them which I had taken from a field between Columbia and Mount Pleasant, belonging, I believe, to the Rev. Mr. Polk, which gave me three-fifths of sandy substance containing some carbonate of lime, and two-fifths of finely pulverized matter, composed of

Carbonate of lime,	26.00
Silica,	13.00
Alumina,	46.00
Iron oxide,	2.50
Animal and vegetable matter,	10.50
Loss,	2.00
	100.00

None of my other analyses produced as much carbonate of lime. Though the beautiful level country around Mount Pleasant generally partakes of the limestone nature, I have found nevertheless some soils that are destitute of it.

The soils which cover the limestone in Williamson and Davidson coincide generally with those of Maury, and the average of several analyses gave me seven-tenths of sandy and three-tenths of fine matter, which consisted of

Silica,	46
Alumina,	44
Carbonate of lime,	4
Oxide of iron,	1
Vegetable and animal matter,	4
Loss,	1
	100

In these analyses I have not taken notice of the moisture the soils contain; I have dried them until the paper on which they lay began to scorch.

The beneficial property of lime in these soils is particularly perceptible, even in those where I did not discover any lime, because though the lime is not perceptible in the soil, the water nevertheless which pervades it, contains a notable quantity of carbonate of lime, and they retain the moisture longer than the silicious soils which cover our high grounds, because they have generally a stiff loamy subsoil.

Our soils cannot be called calcareous. It is known that pure calcareous soil is not well calculated for roots and grain, and every one knows that these products thrive remarkably in the three counties under examination. Our soils, on the contrary, have all the beneficial properties of the argillaceous improved by marl. They are of a yellowish, approaching to mulatto color, sometimes containing more oxide of iron when they are reddish; they are easily diluted in water, and some form good brick clay; but the injurious qualities which are often found in soils that are entirely argillaceous, are not possessed by our soils. They are excellent for maize, cotton and hemp. Some are well adapted for the culture of wheat, and several other products may be raised in them which would advantageously compensate for the cotton, for which the climate of Tennessee is not so well calculated as our more southern states.*

Part of our soil is an old alluvion deposite; it has been brought on by the same causes which have covered some places with pebbles. This diluvial origin, nevertheless, is only attributable to a few spots of our soil. If we examine the coarse part of it, we find it composed of fragments and more or less water-worn pebbles of limestone and chert, or hornstone perfectly similar to the limestone and the minerals which are embedded in it, which pervade these counties, and this fact may be observed at the lowest depth. I have found this to be the case in the excavations made for brick clay in the vicinity of Nashville, Franklin and Columbia. I have never found a pebble which could be supposed to come from a distance; sometimes the silicious petrefactions characterising our limestone are found amongst the water-worn pebbles. But water-worn pebbles are of rare occurrence in our soil; in some places the bones of the mastodon and elephant are found in it. But, although these remains are found in it, it does not therefore follow that they have been carried from a distance. The bones found on the premises of Mr. *Thomas Holt*, near Liberty meeting-house, were contained in a small circuit; they belonged at least to two individuals, a very old and a very young one.† The animals, judging from the manner in which the bones are now found, must have died on the spot; if these bones were brought there by a deluge, we would find them scattered and remote the one from the other, at least we would not find the bones of two individuals in one spot; it is probable that these animals have perished both by the same accident, and undergone decomposition on the spot where they are now found. So that there seems no doubt that the soils of these two counties are the result of disintegration of the strata which once pervaded them.

From the Southern Agriculturist.

THE PRIDE OF INDIA [OR CHINA] AS A MANURE.

Mr. Editor—With pleasure I comply with your request to furnish you with the result of my experiments on "Pride of India as a Manure." I have tried it, as such, for three or four years back—and can, with confidence, speak, as to its great usefulness. My mode of collecting it is somewhat slovenly. I suffer the leaves and berries of the tree to drop off in the fall, when they are gathered, and put as a litter in my cow-pen. I find that cattle eat the leaves with great appetite. This manure, when well laid upon the land and listed in, drives away all kinds of worms and insects. I have tried it on a small piece of cotton land for four years, and while, at all times my other plants were cut down and destroyed by insects, I never knew one plant, growing upon the Pride of India manure, to be touched. I consider the tree an invaluable one, and have accordingly planted it all around my dwelling and negro houses. I should, perhaps, have said, that in collecting this manure, I mix the leaves and berries together. The latter contain a great deal of rich oil, which may be discovered by mashing one of them upon the floor. If this hasty letter can in any way serve you, you can use it as you think best.

A SEA-ISLANDER.

Mr. Editor—You ask me to say what has been the result of my experiment on the Pride of India as a manure. I am no writer, and must beg you to excuse me if I express myself very imperfectly in reference to this matter. I have never tried the Pride of India upon any thing but corn, and some plants in my vegetable garden. I shall tell you how I have tried it with my corn, and what was my success. I always trim my trees, as your correspondent of the January No. advises, and then collect the leaves and berries from the limbs thus lopped off. These I put together into my manure pen to rot—which they will pretty effectually do before spring. Wherever this manure has been put, I have never had any trouble with grubs; my corn has never been cut down by them, and I believe that you can get no insect whatever to live wherever it can be smelt. As an evidence of this, when I wish to get rid of bugs in my bedsteads, I make a decoction of the roots or leaves of this tree, and by saturating the same with the mixture, I totally destroy or drive them away. I have frequently had the cabbages in my garden dreadfully eaten by worms—and by throwing the leaves of this tree over them, they have invariably been totally destroyed. I have never seen the caterpillar on my place; but I hesitate not in saying, that wherever they are to be met with, the Pride of India leaves will destroy them. The late Mr. Reynolds of St. John's, Colleton, once told me, that one year his whole plantation, on Wadmalaw, was infested with these insects, with the exception of a small spot. This spot was near where several Pride of India trees grew, and he never found the traces of an insect near the cotton. If I lived on the island, and planted cotton, I would, with this, manure as much as possible. I consider it in richness, superior to any cotton-seed ever used. There is some little trouble in using the seed for manure, inasmuch as it gives some inconvenience by its springing up with the cotton-seed; but this it does after the cotton has arrived at a pretty good height, and it can be as easily cut down, as the sprouts from cotton-seed manure. The corn which I manured with it, produced me 28 bushels to the acre; before, the same land had been yielding only 15 and 20 bushels, and this too, with the ordinary cowpen manure.

F.

Barnwell District, (S. C.)

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* As it seems that our inhabitants begin to turn their attention to manufacturing pursuits, I would here suggest, in lieu of cotton, to raise Rape seed, (*Brassica oleracea arvensis*, Linn) which produces an oil that can be eaten, that is fit for the lamp, for the manufacture of soap, for the tanners, the fullers of cloth, and is an object of commerce in the Netherlands. The residue of the grain, after the oil is extracted, is used for fatting cattle and hogs for their winter food, or it may be employed as manure, for which it is excellently calculated. Also, Palma christi or Castor oil bean, flax and Hemp, would profitably replace the cotton:

† In order to give an idea of the proportion that exists between the two Mastadons found on the farm of Mr. Holt, I here subjoin the proportional size of the two *dental* or second *vertebræ:* it is as three-fourths to four-fourths.

FRAUDULENT PACKING OF COTTON.

[The following proceedings of the Liverpool merchants, deserve the attention of all those who produce, and deal in cotton in the southern states. Policy, as well as regard to honesty, requires that the name of every individual who packs cotton for sale should be marked on the bales. If our legislature will not guard our national character in this respect, and compel the remedy advised, the merchants of a few considerable purchasing towns could effect the object, by agreeing to buy no cotton of the next and future crops that was not so marked. Every careful cultivator and every honest ginner and packer of cotton would be benefited by the origin of their bales being thus made known. because the quality will always prove creditable to their management: and none of such would desire to avoid the responsibility incurred. At any rate, the general adoption of the plan of marking the bales would at once place all on a fair and equal footing. The dishonest would no longer dare to commit frauds which would be sure to be detected, and brought home to them—and honest planters and ginners would not have their cotton to sustain (as now) a diminution of market value, of such amount as will indemnify merchants for all losses from the fraudulent practices of others. Though such a deduction, for insurance against fraud, is not named in bargains between the planter and merchant, it nevertheless forms a regular item, which the honest planter pays solely for the gain of the rogue: and this deduction for insurance will necessarily increase as the frauds become more frequent—and these of course will continually increase as the safety from detection becomes more sure and well known. It is far more important to the interest of the planters and ginners, than of the merchants, that this system of fraud should be exposed and stopped.]

At a general meeting of the Liverpool American Chamber of Commerce, held 27th of November, 1835, for the purpose of taking into consideration and adopting the most effectual measures for the prevention of frauds in the packing of cotton in the United States: T. B. Barclay, Esq. president, in the chair: a memorial was read from the association of cotton brokers, entering into detail of the grievances complained of. It was

Resolved, That the same be printed and appended to the present proceedings. It was also

Resolved, That it be respectfully submitted to the factors and merchants at the shipping ports, to consider the expediency of applying to the legislatures of their respective states for the enactment of laws, to make it imperative on each planter to have his name and residence written or stamped on each package; the effect of which would be to stimulate him to increased care in the packing of his cotton, so that his reputation might be established and preserved; and whereby those having claims to redress might be enabled more readily to substantiate them.

It was further suggested, that in the meanwhile the planters should be requested voluntarily to affix their names on the packages, it being the opinion of this meeting, that cotton so distinguished would command a preference in the sale in this market.

It was also observed, that as the frauds are not generally discovered until the cotton is opened at the factories, from whence the damaged part, or the whole package, is returned to the importer with expenses, he is frequently called upon to pay losses long after his accounts have been settled with the shippers or owners of the cotton; who again have in such cases at a still more remote period to seek for redress from the factors or planters.

Resolved, That these resolutions be signed by the president, and printed, and that the members of the association be desired to transmit them to their correspondents in the United States, with a request that they will adopt such measures as may appear to them most likely to accomplish the object in question. (Signed)

T. B. BARCLAY, President.

COTTON BROKERS' ASSOCIATION,
Liverpool, 6th Nov. 1835.

To the American Chamber of Commerce.

Gentlemen—We the undersigned members of the Cotton Brokers' Association beg leave to call the attention of the American Chamber of Commerce to a subject of considerable importance to the cotton trade in general, but particularly to that part of it connected with the sale and import of cotton from the United States, viz. the fraudulent practices in the packing of cotton.

This species of fraud has long been the source of much inconvenience and vexation to all concerned in the cotton business; but whether from the unfrequency of the occasions, when distributed amongst so many, or from the smallness of the loss in the scale of mercantile transactions, no measures have hitherto been taken to arrest its progress. For the same reasons, to which may be added the difficulty of obtaining redress, the claims arising from this cause are frequently demanded rather as a matter of form, and often are altogether abandoned, and if allowed on this side of the water, are seldom (as we understand) successfully prosecuted against the parties on the other. This impunity, as might have been expected, has operated as a direct encouragement to such dishonest practices, which, commencing with the lesser fraud of introducing seeds, waste, stones, and sand, into the interior of the bale, have at length extended to a wholesale and systematic plan of deception and plunder by means of *"false packing."*

The ordinary mode of effecting this is, by a plating or thin layer of good cotton on the two sides of the bale usually sampled, the inside being wholly composed of a very inferior quality. In some cases however the outer layer consists of a quality differing only a few degrees from that in the inside, which is again packed in layers of various qualities, but all of them worse than the outside; the obvious intention of which being to render the fraud more secure by adding to the difficulty and uncertainty of detection. The experience of the present year furnishes abundant proof of the increase of this practice. It is not now as formerly confined to an occasional bale or two, but it is extended to whole parcels of one or two hundred bales in a lot; and when it is considered that the difference between the real and apparent value of the cotton may be three or four pounds sterling a bale, some idea may be formed of the magnitude and dangerous consequences of the fraud.

Having now brought the subject under the notice of those who are the most deeply interested, as we conceived it to be our duty to do, we leave it to their wisdom and experience to provide a remedy.

Amongst other motives for our interference is the desire we feel to preserve unimpaired the confidence which has heretofore subsisted between the buyer and the seller, and to maintain that character for honor and fair dealing which has ever been the pride and boast of the cotton trade.

[Signed by 59 Mercantile Houses.]

From the Journal of Commerce.

IMPROVEMENTS IN THE MANUFACTURE OF SALT.

It is calculated that about twelve million bushels of salt are consumed in the United States per annum, of which about 7,000,000 are imported. The bulk and weight of the article make its transportation a principal item in the cost. According to a statement in the Journal of the American Institute, it is now purchased abroad at an average price of 13¾ cents a bushel; yet its cost in this city is from 30 to 35 cents by the quantity, and at that price it affords but a moderate profit to the merchant. Salt made at Salina at 6 cents a bushel, sold at Utica before the completion of the canal at $3 a barrel; and although the legislature have made it free of toll, and offered a liberal bounty for its delivery on the Hudson, the manufacturers have as yet been unable to do so at a remunerating price, by reason of the competition of foreign salt. For consumption in the interior, very large quantities are manufactured in western New York, western Virginia, and several other states. It is a remarkable arrangement of Providence, that while near the sea-board saline springs are rarely or never found, (at least in this country,) they are abundant far in the interior. In this state they are found to extend through the counties of Onandaga, Cayuga, Seneca, Ontario, Niagara, Genesee, Tompkins, Wayne and Livingston; and it has been said that the whole country west of the Alleghanies is underflowed with salt water.

On the sea-board, particularly in the region of Cape Cod, the manufacture of salt has long been carried on extensively, but is represented to be now in a declining state, on account of the low price which the article commands. The cause is less to be regretted than the effect. But surely, if it be possible by improved methods of manufacture to make the business profitable, and even to reduce the price of the article below what it is at present, every friend of his country would wish success to the enterprize. Such improvements are stated to have been actually made by Dr. E. C. Cooper, and are about to be put in operation on a large scale. It is well known that on the sea-board the manufacture is carried on entirely by evaporation. Of course a vast extent of surface must be exposed to the action of the sun, which, in the old method, is effected by extensive vats, with moveable roofs to shelter them from rain when occasion requires. These vats or rooms as they are technically called, vary from twelve to eighteen feet in width, and from 18 to 200 feet in length. They are generally made in four divisions, viz. the weak and strong water rooms, the pickle and salt rooms, in the last of which only, salt is formed. Except the pickle and salt rooms forming about one-eighth of the whole. Dr. Cooper's plan substitutes for all the rest *inclined plane beds*, made directly on the ground, and rendered water tight by hydraulic cement. They are then covered with coarse gravel, which acting by capillary attraction, distributes the salt water in the most minute quantities over the whole inclined plane surface, and thus exposes it to evaporation while flowing down. By this plan the cost of the works is reduced from $1 to 15 cents per 10 square feet, and there is also a very great saving of labor, in consequence of dispensing with so large a portion of the roofs. When rain occurs, the insertion of a plug separates the inclined planes from the pickle and salt rooms, and the rain water thus flows away. Any person who is curious to see a more particular description of this improvement may find it in the 4th number of the Journal of the American Institute, just published. A capital of $6000, according to this authority, will construct ten acres of the work, yielding 12,000 bushels of salt per annum, at an expense which will allow it to be sold at 10 to 12 cents a bushel, and at the same time afford the manufacturer a liberal profit. Dr. Cooper has secured a patent for his improvement, and proposes to form a joint stock company for the construction of salt works on Long Island, with a capital of $100,000, which he calculates will yield near 200,000 bushels per annum. Of the practical operation of the thing, we of course know nothing personally; but from the description given of it, we are led to anticipate favorable results.

OF THE LEAVES OF THE MACLURA AURANTIACA, (*Osage Orange,*) AS A SUBSTITUTE FOR THOSE OF THE MULBERRY, AS FOOD FOR SILK WORMS.

By M. MATTHIEU BONAFOUS, Director of the Royal Garden of Botany and Agriculture, at Turin.

Translated for the Farmers' Register from the *Annales de l'Agriculture Française*, of Oct. 1835.

[The following facts—which with more of assurance promise the attainment of the long desired substitute for the leaves of the mulberry, when the leaves of the latter are destroyed by late frosts—are the more important in this country because the *maclura aurantiaca* is a native of North America, and grows naturally in regions where the climate is more rigorous than in the middle Atlantic states. The late frosts that unexpectedly destroy the young leaves of the mulberry, and would leave the silk grower without means of keeping alive his newly hatched worms, are of rare occurrence: but whenever they do occur, without sufficient precautions, the worms must perish—and the whole business of that year be at an end. Hence the great value of any plant that can furnish a cheap and sufficient substitute for the mulberry, during the short duration of such seasons of scarcity.

There can be no higher European authority on this whole subject than M. Bonafous; but still it would be desirable to have his experiments repeated in this country. We would especially request this of a gentleman in Goochland who has the Osage orange growing, and to whom we were indebted for the account of it, published at p. 543 of this volume—and to whom, we regret to say, this journal has been indebted for no other original matter, although we have frequently, and with pleasure, copied his communications to other and distant papers. Of such preference, however, we have no right to complain.]

The production of silk has become so fertile a source of riches, that the frosts of spring cannot cause injury to the young leaves of the mulberry, without affecting seriously the interests of agriculture, and of industry in general.

To preserve this tree from the frosts, which so often occur unexpectedly even at the moment when the silk worms are about to come out of the eggs, has induced cultivators to adopt various measures—as planting in the best exposures, heaping earth around the lower part of the trunk in autumn, covering with straw, and throwing manure over the roots, &c. But these precautions are commonly useless, if the frost occurs after the sap of the mulberry is rising.

Researches have also been made to find some plant that could supply the place of mulberry, when late frosts suspend its vegetation. The wild bramble, the rose, the elm, *l'epine vinette*, the maple of Tartary, the Spanish scorzonera, and lastly, the *cameline*, have been proposed as substitutes,* and if experience proves that some of these plants may feed the silk worm, it also proves that they cannot make it produce the glutinous [*resineuse*] matter, considered necessary to the formation of the cocoon.

I was thence induced to believe that it would be difficult to discover a substance both suitable to take the place of the mulberry, and able to resist frosts. However, being at Montpelier, in April 1834, when the cold of four degrees (of Reaumur) below zero,† injured a great number of mulberry trees, I was curious to study the effects of the cold upon a multitude of plants cultivated in the *Jardin de l'Ecole-de-Médicine;* and having observed that a tree of the family of the *urticées*, (which botanists do not distinguish from the mulberry except by its flower having a *single* style,) had resisted this lowering of temperature, while the white mulberry, the black, that of the Philippines [or *Chinese*] and the mulberry of Constantinople, had not been able to support it, I thought it useful to ascertain whether this tree, recently introduced into Europe under the name of the *Maclura Aurantiaca*,* could be successfully employed for the nourishment of silk worms.

For this purpose, I had hatched the eggs of a Syrian variety of silk worms, which I had received, and scarcely had the worms left the eggs, when I formed of them two divisions, which I fed in the same locality, the one with the leaves of the Maclura, and the other with those of the white mulberry. The worms fed with the *maclura* had a more rapid growth during the two first ages; but afterwards, the worms fed with mulberry leaves, in their turn, took the superiority over the others, and maintained the superiority up to the time of their *climbing*. The worms fed with the *maclura* acquired a greenish tint, which made them easily distinguishable from the others; and, although at a later time, by seven or eight days, they formed cocoons of a regular structure, and of as firm a texture, as those of the worms fed by mulberry leaves: such were the cocoons of M. Farel, correspondent of the *Société Royale et Centrale d'Agriculture*, sent me from Montpelier, as soon as he had completed (under the eyes of the agricultural society of Herault,) the comparative rearing of the two kinds, which my leaving the department had not permitted me to conduct myself, to its termination.†

It follows then, from this fact, that the *maclura aurantiaca*, without offering all the qualities which render the mulberry so well suited for feeding silk worms, presents still a most important advantage, that of not being injured by a degree of cold which the mulberry cannot endure, and of being able to supply its place, until the mulberry shall have put out a second growth of leaves. It is true that I cannot mark the limit at which the maclura ceases to vegetate in Europe: however, I can affirm that it has never yet been injured by freezing in the Botanic Gardens of Paris, of Strasburg, of Geneva, &c. nor in that [of Turin] which is under my direction, where I introduced this tree five or six years ago.

In calling the attention of agriculturists to this first experiment, I would wish to induce those who are engaged in silk culture to plant some stocks of *maclura*, to supply nourishment to their worms, when the leaves of the mulberry are nipped by frost. A *maclura* of 12 to 15 feet in height, such as that of Montpelier which served for my experiment, will suffice for the feeding, during the two first ages, as many worms as will be produced from two to three ounces of eggs.

Originally from North America, where it grows on the banks of the Missouri, and in the country of Natchez, the *maclura aurantiaca* rises to 30 feet, with a diameter of 6 to 8 inches. Its trunk is milk-yielding, and covered with bark that is readily divided into threads, and the branches are flexible, and armed with thorns which disappear at adult age, as I have observed on the tree at Montpelier. The roots yield a lively yellow tint. The leaves are alternate, on foot-stalks entire, 5 to 6 inches long, and 2 to 3 wide, oval and acuminate, glossy on the upper surface, and slightly

*Recherches sur les moyens de remplacer la feuille du mûrier par une autre substance propre au ver à soie; par M. Bonafous.—*Mémoires de la Société royale et centrale d'agriculture, année*, 1826.

See also an article on Scorzonera as food for silk worms, p. 471, Vol. III. Farm. Reg.

†Equal to 22 degrees of Fahrenheit's thermometer, or 10 degrees below the freezing point. Ed.

*Nuttall—Genera of North American Plants, p. 233—II.

†Bulletin de la Société d'agriculture du départment de l'Herault, Octobre 1834.

hairy on the lower, of an acrid taste, and becoming dry less quickly than those of the mulberry. The male of flowers, forming a lengthened spike [*chaton*] presents a calyx of four divisions, without carolla, and four stamens. The female flowers, borne upon another stem, have a smaller calyx, without carolla, a thread-like style, hairy, and numerous ovaries united in a spherical spike. The fruit is a pulp with many cells, of the size and color of an orange, good to eat, as some say, but not eatable according to Michaux, to whom we owe the introduction of this tree. Each cell encloses a compressed oval seed.*

The *maclura aurantiaca*, on account of its points of relation to the mulberry, has improperly been called the mulberry of the Osages—the name of a tribe of savages who inhabit Louisiana, and who use its branches to make their bows. It thrives well on both fertile and inferior soils, and is reproduced easily by seeds, by layers, by gratis upon the paper mulberry, (*broussonetia papyrifera*,) and still better, by slips of its young branches or roots. In this last mode of multiplication, which I believe the most proper, the roots are cut, when they are nearly the size of the finger, into lengths of 7 or 8 inches; the pieces are planted in a cool and sheltered place, and not leaving but 2 or 3 lines of each above the ground. The plant succeeds equally well as a standard, in a hedge, in shrubbery, or as an espalier.

The utility of the *maclura aurantiaca*, considered as an auxiliary of the mulberry, its resistance of late frosts, the elegance of its form, the facility with which it can be multiplied, the vigor of its growth, and the pliability of its branches, which permits their being applied to various uses—all these qualities assign to it a distinguished rank among the foreign trees, that are the most suitable to enrich our agriculture, and to embellish our country.

For the Farmers' Register.

QUERIES AND REMARKS ON LIMING IN DELAWARE.

Kent County, (Delaware,)
February 1st, 1836.

The Editor of the Farmers' Register is requested to answer the following queries, in that publication.

1. What quantity of slacked lime would be safe and profitable to apply to an acre of light lands, very similar to these described in the Essay on Calcareous Manures, in the tide-water region of Virginia, reduced by hard tillage to about five bushels of corn per acre.

2. Would farmers in this region, two miles from tide-water (navigable) be remunerated at a cost of twelve and a half cents per bushel, including all expenses—of purchasing the lime, carting, spreading, &c.?—with such other information as the editor may please to suggest. The farmers in this poor, and almost exhausted country are just beginning to feel the want of aid from some source or other, to relieve their deplorable situation. Several have read the essay mentioned above, and never seem before to have understood the action of lime as a manure. The almost total ignorance on the subject, has prevented many from commencing the use of lime—and caused others to abandon it who commenced the business with erroneous views of its effects as an agent to resuscitate our almost exhausted lands. The people are awake to the importance of the subject, and only want a master-spirit to contrive and direct their operations.

We have frequently stated that our experimental knowledge of quicklime, is almost nothing—and that our opinions as to that substance, are founded on the known effects of mild calcareous manure, and the supposed difference of action between the two substances. We therefore would rather rely on the experience of others in this branch of the general subject, which has been presented in various parts of this journal—and particularly would we recommend to notice, the views of M Puvis, and the French practice of light dressings of lime, given in Nos. 6 and 7 of this volume. If a more precise answer is required, and the lime is to be used alone, and not according to the method just referred to, we would advise for such poor lands fifty bushels of burnt shells (measured before slaking,) in preference to a larger quantity. As to the second question, there can be no hesitation in answering affirmatively.

The few observations of our correspondent form the only notice of the agriculture of Delaware which has been offered to this journal; and they present, in a strong point of view, the deplorable want of knowledge on the value of calcareous manures, even in regions where they are most required, and would be most profitable—and also, the very slow progress that published information on agriculture makes through our country. It has been fifteen or sixteen years since Dr. Samuel Black of Delaware presented, to an agricultural society of that state, a long essay on the improvement of land by liming, which was published, and extensively circulated. It is true, that his facts were very limited, and his speculations visionary, and often erroneous: but there was much (even in his exaggerated expectations of profit,) to attract attention to the subject: and even if no other information had been elsewhere offered, it would have been expected, that the practice of liming would, on his recommendation, have been tried sufficiently to be approved and established in Delaware.

INUNDATION OF A MINE.

On the 20th of June, 1833, while Mr. Montgomery, banker, in Irvine, and another gentleman, were engaged in fishing on the river Garnock, nearly opposite to where they were standing a slight eruption took place, in the current of the river, which they at first supposed to be occasioned by the leap of a salmon; but the gurgling motion which succeeded, led them to suppose that some-

*All the plants of the *maclura* now existing in the gardens of exotics, on the continent of Europe, have proceeded from five slips sent from Baltimore in 1815, by M. Victor Leroy to M. André Michaux. Four of these slips were planted in the nurseries of M. Cels, and the fifth in the *Jardin des plantes* of Paris.

thing serious had occurred, and that the river had broken into the coal-mines which surrounded the place on which they stood. They immediately hastened to the nearest pit-mouth, and stated their suspicions; which the pit head-man at first was slow to believe—and it was only after Mr. Montgomery had strongly remonstrated with him that he at length prepared to avert the danger. By this time, however, the men below had heard the rushing forward of the water, and were making the best of their way to the bottom of the shaft: but before they had reached it several were up to their necks in water—and in two minutes more, it was believed, every one of them would have been drowned. Immediately on the whole of the men being got out of the pits, Mr. Dodds, the active manager of the works, assembled all his men at the cavity in the bed of the river, over which they placed a coal-lighter, laden with such things as they thought calculated to stop the rush of the water, as straw, whins, clay, &c.; all their efforts, however, proved unavailing, for the water continued to pour into the mines without obstruction, producing comparatively very little agitation on the surface of the river until the following afternoon. when a tremendous large space broke down, which in a short time engulfed the whole body of the stream, leaving the bed of the river quite dry for more than a mile on each side of the aperture, where there had previously been a depth of fully six feet. At this time the fishes in the channel were seen leaping about in every direction. On the flowing of the tide, the depth of the water betwixt the chasm and the sea increased to about nine feet—then the desolation was awful! The long sweep and prodigious quantity of water rushing into the chasm at this time, made the sight impressive beyond description. Three men who were in a boat near the spot, had a very narrow escape from being sucked into the vortex; for no sooner had the men got out than the boat was drawn down with fearful rapidity. The great body of water continued to pour down the chasm, until the whole workings of the pits, which extend for many miles, were completely filled; after which the river gradually assumed its natural appearance, and the water attained its ordinary level. At this time the pressure in the pits became so great, from the immense weight of water impelled into them, that the confined air, which had been forced back into the high workings, burst through the surface of the earth in a thousand places, and many acres of ground were to be seen all at once bubbling up like the boiling of a cauldron. In some places the current was so impetuous as to form cavities four or five feet in diameter, and produced a roaring noise, like the escape of steam from an overcharged boiler. Immense quantities of sand and water were thrown up like showers of rain during five hours; and in the course of a short time the whole of Bartonholme, Longford, Snodgrass, and Nethermains, were laid under water; by which calamity from five to six hundred persons, men, women, and children, were entirely deprived of employment. By this unfortunate occurrence the extensive colliery works in question were injured to an extent which almost precludes the hope of their ever being restored to their former state.—*History of Fossil Fuel.*

For the Farmers' Register.

COMMERCIAL REPORT.

An advance in the prices of the most important articles of domestic produce has marked the operations of the present month. Cotton commands in the southern markets on the sea board, 13 to 16½ cents—and this is the present quotation in Petersburg. The planters continue to hold back supplies to a greater extent than in previous years—but the quantity exported rather exceeds that of last year.

Tobacco continues to maintain high prices—embracing all rates, from 5½ to $12. The crop in Virginia and North Carolina is neither as good in quality or as great in quantity as the last one; but that of Kentucky is expected to make up the deficiency.

Flour has slightly improved in price, and may be quoted at 6¾ to $7.

Several parcels of wheat and oats have been imported into New York, from England and Holland.

Corn and pork are higher than usual in every market.

A great addition to the banking capital of almost every state has recently been created, or is now under consideration. The United States Bank, whose original charter will expire the 4th of March, has been re-chartered by the state of Pennsylvania, in consideration of a large bonus to be paid, besides giving aid to numerous works of internal improvement. Capitals of five, ten, and twenty millions are granted to, or applied for in several commercial cities—and the legislature of Virginia is considering the subject of increasing the banking capital of this state. An additional stimulus will no doubt be given to internal improvements and manufactures, by the facility of raising money. It is to be hoped that the facility may not lead to imprudence.

X.

SEASON AND CROPS.

So far, the winter has been very unfavorable to farming labors. The early part was very mild—but the latter, until past the middle of February, remarkably cold. Throughout, there has been much rain, and snow, but not enough continuance of the latter to be of service to the wheat crop. The earth has been generally too wet, when not frozen, so that but little ploughing has been done since Christmas, and the preparation for the spring crops will be generally very late, if not executed improperly.

The wheat left by the great autumnal ravages of the Hessian fly, is said to have promised well, before the late and long freezing of the earth.

The unusual dampness of the last corn crop, as has been several times stated in this journal, caused much to be injured, by being shocked in the field, or when gathered, at the usual times for those operations. Without care, the danger of farther loss is not yet past. The grain is not yet perfectly dry, and will not bear being shipped, or otherwise kept in bulk after being shelled, as early as in most years.

We have received from correspondents but very few and meager notices of the season and crops.

THE FARMERS' REGISTER.

Vol. III. | APRIL, 1836. | No. 12.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ON THE USE OF MARL AS MANURE.

BY M. PUVIS.

Translated for the Farmers' Register, from the Annales de l'Agriculture Francaise, of 1835.

[Continued from page 696.]

Among so many different practices, we may nevertheless arrive at an estimate of a reasonable dressing of marl, for soils of middling consistence, which then may be altered as circumstances require: it will be a great service rendered to practice, even to approach thus near to the precise directions which are so much wanted.

The object of marling, is to give to a soil the qualities and advantages of a calcareous soil. Then the analysis of the best calcareous soils, of the best soils of Flanders among others—the practice of the countries where marling is the most ancient, and the best regulated—the dressings that Thaër advises—the summary of numerous marlings given by Arthur Young—all have made us conclude, in the *Essay on Marl*,* that the proportion of 3 per cent. of carbonate of lime, in the tilled layer of soil, on an average, ought to suffice. But marl more or less rich, and tillage more or less deep, either or both, would require variations in the quantities of marl, to preserve a fixed proportion of carbonate of lime in the soil.

To facilitate the application of this rule, derived from experience and reasoning, we give a table which contains all the elements of marling, and of which it will be easy to make use. It is made for marl of all degrees of richness, from 10 to 90 per cent. of carbonate of lime, and for all depths of ploughing from 3 to 8 inches. By taking the intermediate averages, we will have, for every depth of ploughing, and for every quality of marl, the number of cubic feet to carry upon a hectare of land. The cubic feet are estimated by the capacity of the carts; because the marl, in crumbling afterwards upon the soils, acquires as much bulk as it occupied in lumps in the carts, with the vacant spaces between the lumps.†

When the marl contains of carbonate of lime.	Number of cubic feet of marl necessary (per hectare) to a tilled layer of the depth of					
	3 inches.	4 inches.	5 inches.	6 inches.	7 inches.	8 inches.
per cent.	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.	cubic feet.
10	7.106	9.474	11.842	14.212	16.580	18.948
20	3.553	4.737	5.921	7.101	8.290	9.424
30	2.368	3.158	3.947	4.737	5.527	6.316
40	1.776	2.368	2.860	3.552	4.144	4.736
50	1.420	1.880	2.350	2.820	3.290	3.720
60	1.178	1.570	1.962	2.354	2.748	3.140
70	1.020	1.360	1.700	2.040	2.380	2.720
80	888	1.184	1.480	1.776	2.072	2.368
90	775	1.032	1.292	1.550	1 809	2.027 ‡

* *Essai sur la marne*, the original work of M. Puvis, referred to in the introductory remarks to this translation.

† The proportion of three per cent. of carbonate lime is far too much for safe and profitable dressings. One-third of that quantity is most generally enough, and it would very often do injury to exceed this proportion. It is true that no fixed proportion can be universally applied—and three per cent. may in some cases be given with safety and advantage, and in others, one per cent. would be hurtful. Still, if any general average may be assumed, after making due allowance for causes for exceptions to the general rule, our experience would fix on *one per cent.* as abundantly high for that average dressing. This is for the *acid*, or naturally inferior soils of Virginia, where marling in proper proportions does most good—and most harm, if applied improperly, or in excess. On better soils, having more lime naturally, marl will be of far less service, but may be applied in heavier dressings, without damage to the soil. It is probable that many of the marled soils in Europe are of the latter kind.

‡ The marling table of our author, is on a good plan to aid calculation, but it is nearly useless to the American reader, not only for assuming 3 per cent. as a suitable dressing, but because the land is measured by hectares, and the marl by cubic feet, an unusual measure little suited to the practice of farmers, and still less as the French linear foot is to ours as 1.066 to 1.000. For these reasons, the table would have been rejected, and substituted by another, but for an unwillingness to alter the author's text; and especially as he refers to some of its particulars afterwards. The following table is constructed upon a plan suited for

But this average dressing, [giving 3 per cent. of carbonate of lime to the soil,] ought still to vary in many cases. If the marl is argillaceous, or on argillaceous soil, the dose ought to be diminished. When a soil of this kind, marled heavily with argillaceous marl, is worked after rain, it is made into a sort of mortar, which hardens, and becomes like brick, in drying, and which does not afterwards crumble but with rain.*

Still more ought the dose of marl to be diminished in proportion to the lightness of the soil, and we think that it ought to be lowered almost to that of Sologne (250 cubic feet to the hectare,) a quantity which we regard as reasonable, and as directed by experience ,as much as by economy, on very light soils. On the contrary, the proportion ought to increase with the humidity of the soil. In a very moist soil, a small dressing might not suffice: but nevertheless, it is necessary to guard against making the soil too argillaceous.

Precautions necessary to be taken in marling.

The first requisite for the success of marling, is that the soil should be well drained, and be able to rid itself of the surface water. Marl doubtless may effect much; but it is not sufficient of itself, to put in good condition [*assainer*] a marshy soil. Like lime, it cannot exercise its action, but when the soil, by its natural texture or position, or by means of labor applied to it, can free itself from superabundant water.

The carting of marl ought to be done in good weather, in order that the ground may not be poached and kneaded under the feet of the teams and the men, and the wheels of the carts. It should be either in a dry season, or when the earth is frozen. However, if the roads are good, we may profit by every leisure time of the teams, in drawing marl upon a corner of the piece to be marled, to be put over the ground afterwards by

our use, and with the more proper quantity of one per cent. of carbonate of lime, as the proportion to be added. The land measure is the English acre, and for the marl, the Winchester bushel, both being used in Virginia. Though the measure here is of course the even bushel, (of 2150 three-fifths cubic inches,) and marl, in practice, is measured heaping, in truth the two measures do not vary much, as the measure loosely heaped when filled, would not be more than even, when settled by standing, or by being jolted in the journey of the cart.

A glance at this table will direct what number of bushels of marl, of any degree of strength between ten per cent. and one hundred, will give one per cent. of carbonate of lime to any depth of tilled soil, from three to eight inches. For example, of marl of thirty per cent. mixed with six inches depth of soil, five hundred and eighty-three bushels would be required for the acre; and of marl of eighty per cent. in a soil ploughed only four inches, one hundred and forty-five bushels would give the same proportion.

When the marl contains of carbonate of lime per ct.	*Number of bushels of marl necessary to give one per cent. of carbonate of lime to an acre for a ploughed depth of soil of*					
	3 inches.	4 inches.	5 inches.	6 inches.	7 inches.	8 inches.
10	875.10 †	1166.80	1458.50	1750.20	2041.90	2333.60
20	437.55	583.40	729.25	875.10	1020.95	1166.80
30	291.70	388.93	486.17	583.40	680.63	777.87
40	218.77	291.70	364.62	437.55	510.47	583.40
50	175.02	233.36	291.70	350.04	409.38	466.72
60	145.85	194.46	243.08	291.70	340.31	388.93
70	125.01	180.97	208.36	250.03	291.70	333.37
80	109.38	145.85	182.31	218.77	255.23	291.70
90	97.23	129.64	162.05	194.46	226.88	259.29
100	87.51	116.68	145.85	175.02	204.19	233.36

* This effect is a proof of the dose of marl being improperly heavy, independent of the particular facts named. If no more carbonate of lime is applied than is serviceable, its action is almost wholly *chemical*—and one part of that action is to make clay soils lighter, and sandy soils more stiff and adhesive—and so strong is this chemical action, that it over-balances the mechanical action of the sand or clay, which form the larger part of the marl. Thus, a marl though very sandy, will still stiffen a sandy soil—and one though argillacious, will lighten a compact and close clay soil. But if these marls are applied in thrice the quantities required for chemical action, then two thirds of the quantity are in excess—and exert mechanical power only. Then, if sandy, this excess of marl increases the lightness of soil, and if argillacious, makes the soil more so than before, and it may be, to a very hurtful extent.

† The fractional parts of bushels are *hundreths.*

tumbrils, or wheelbarrows. The exposure of marl to the air before spreading it, is always useful, but not indispensable.*

On a moist soil, it is expedient to precede the marling by a deep ploughing, because that then is there offered to the water, a thicker permeable layer of earth; there will be less injury from the excess of moisture, and the layer meliorated and mellowed by marl, will also be deeper.

The marl ought to be placed upon the ground in parallel lines, in small and equal heaps, at 20 feet distance between the heaps and between the lines. Advantage should be taken of the first leisure time in good weather, to spread the marl, as regularly as possible. After some days, and alterations of sunshine and rain, the ground should be passed over again to equalize the marl, and to make what has crumbled to powder cover as much ground as possible; the amount and quickness of the good effects depend much on this care. The layer of marl, is then left to be aired upon the ground as long as possible: there is established a reciprocal action, by aid of the air, and atmospherical variations, of the surface of the soil and the marl, which prepares for the effects—hastens, and gives them more energy.

Marl ought not to be covered by the plough except when it is well crumbled, and almost dry. In burying it wet, it resumes its adhesion and forms lumps, and it cannot be diffused through the soil. That ploughing also should be shallow, because the marl is then kept in the layer of vegetable mould, for the benefit of the succeeding culture.

When the marling has been too heavy, by a deeper ploughing we may bring to the surface the earth not marled, which being mixed, diminishes the proportion of marl. This operation, by increasing the depth of the tilth, lessens the injuries produced to the soil by heavy rains.

Marl is used with advantage upon winter crops, as well as those of spring. It is very usefully employed in compost, whether with farm-yard manure, or with mould or sods. However, these composts if made with clay marl are a little more troublesome to make and to arrange afterwards, than if made with stony marl. The English make much use of marl in this mode, especially when it is distant from the fields where its application is wanted—because for marl, as well as for lime, by composts the effects of small doses are much increased.

The effects of marl are not always very perceptible upon the first crops; and that occurs when it has been spread with little care, or has not been mingled with the soil by proper tillage—when it has been buried [wet] by the rain, or by a too deep ploughing—or finally, when there has followed the dressing an uninterrupted succession of rainy, or of dry weather. It is necessary there should be an alternation of heat and moisture that the combinations, (by the aid of which marl acts on vegetables,) may be formed in the soil.

* The advantage stated to be derived from letting the heaps of marl stand to be crumbled, belongs to a clayey or chalky texture, and very rarely, and then but slightly, to our marl of fossil shells in Virginia.

Of the effects of marl upon vegetation, and upon the soil.

The effects of marl upon the soil resemble much those of lime: it is still the creation of calcareous soil and its products. Marl promotes the growth of all the families of cultivated plants: however, its effect upon the grains of small culture [*grains menus*] and upon forage crops, is more considerable than upon cereal plants. It increases, by at least twice the amount of the seed, on an average, the product of winter grains—but it almost doubles the products of the smaller crops of barley, Indian corn, and clover. The marling of oats produces a vigorous growth; but the leafing time is prolonged, and less grain is formed. Winter wheat, sown *par le sec*, is subject to lodge, as on calcareous soil: in place of the grain being plump, yellow, and thin skinned, as on limed land, marled land produces grain that is more long, grayish, dull, and which yields more bran. Sandy marl yields more grain—clay marl more stalk or forage.†

The dogstooth, *l'avoine a chapelet*, the bent grasses [*agnostis*] the small grasses, pests of culture on silicious soils, disappear after marling, and give place to the small leguminous and other plants of calcareous soils.

French agriculture makes little use of marl on meadows: English agriculture, on the contrary, uses it with advantage on pasture land and the meadows not irrigated. But it is rather the marl in compost, than the marl alone, which serves for this use—and the stony, rather than the argillaceous marl.

The characters which marled soils exhibit are very similar to those of limed soils, and naturally calcareous soils—but more similar to the latter. The doses given by limings, which are scarcely a tenth of the quantities of carbonate of lime applied in marlings, do not so essentially change the appearance of the soil. The marled soil, like the calcareous, hardens and contracts with drought—and then splits and crumbles with rain or heavy dews.‡ Marled land acquires a reddish color, and

†The last sentence serves to explain and correct the preceding passage, and to accord with the truth stated in the first lines of the paragraph, that both *liming and marling are merely the creating a calcareous soil*—and to maintain the plain inference, that the effects on vegetation, should be the same. The small increase attributed above (and in other parts of the text,) to marling wheat, &c. compared to the far greater known effects in Virginia, from lighter dressings, show that the soils in France are not so deficient in lime, and therefore not so fit to be benefited by the application of marl. Again—if the grain of wheat is in truth made less perfect by marling than by liming, the difference of effect must be caused not by the marl which acts as carbonate of lime, (chemically,) but by the excess of the dressing, which acts mechanically, and merely as so much clay or sand, according to the texture of the marl.

‡These are additional marks of a soil too highly calcareous, or too heavily marled. No such effects follow

presents an open or spongy [*cariee*] surface, in place of the white color and glazed surface of the *white lands* [*terrain blanc.*] The soil, made mellow, may be tilled in every sense—crumbles with the first rain, and becomes more accessible, as well as the plants which it bears, to all atmospheric influences. The roots traverse the marled and more permeable soil more easily—and the juices which form the sap can circulate, and consequently be more easily absorbed by the roots. It may be well conceived that all these new qualities render the soil, and its products, better. We refer, for the balance of this subject, to what we have said upon lime, as the same will apply very nearly to marl.*

Of second marlings.

We now arrive at a long disputed subject, and upon which it will be perhaps more easy to be understood.

Second marlings do not suit, and ought to be long deferred, where the first has been abundant. If they have not succeeded in Ain, in Isere, in Yonne, it is because in the first marlings there were applied doses which furnished to the soils, 4, 5, 6, 8, 10 per cent. of carbonate of lime—any of which proportions is much beyond what was wanting, and often beyond what was advantageous, and which addition has been held by the soil for an indefinite time. But in places where marling has become a regular operation of agriculture, we may take points of departure which will enlighten us. In the marlings the most regular and the most ancient of the classic husbandry of the department of the North, the soil receives every 20 years on an average, 160 hectolitres [to the hectare] of stony marl, which contains three-fourths at least of carbonate of lime. This then is 6 hectolitres a year, of carbonate of lime, which is given to the Flemish soil, to make it continue to produce with the same energy.†

A quantity which would suffice for argillacious soils, is too heavy for light soils. We have seen that they give in Sologne every 10 years, from 240 to 300 cubic feet, to the hectare, of marl which contains 40 per cent. of carbonate of lime. This is 4 hectolitres, a year, of the calcareous principle. It would seem then, that the soil and vegetation absorb, or consume, from 4 to 6 hectolitres of carbonate of lime, to the hectare a year. Our second marlings should then be given in such manner as to furnish to the soil for each year, from 4 to 6 hectolitres of carbonate of lime, according to the consistence of the soil, in the operations which are repeated every 20 or 30 years. (These results would doubtless simplify much the question of marling, and its application to soils of different natures.) The life of man is generally too short to enable him to be sufficiently enlightened by comparisons—and one has an immense advantage when a great work, like marling, can be placed upon the exact results of long continued and enlightened practice, such as we can now refer to.

If we compare this result to that which we have found for second limings, we will conclude that the soil and its plants seem to demand a greater quantity of carbonate of lime—than of lime, since 3 hectolitres of lime, on an average, suffice for the hectare, in place of 5, on an average, of carbonate of lime, which quantity is required for second marlings. But subtracting the proportion of carbonic acid from the carbonate of lime, there is given 3 hectolitres of lime in this case, as well as in the other; which is a very remarkable coincidence, and a guarantee of the correctness of our lights upon lime and marl.‡

We will remark that with the dose of marl which we have advised, giving 3 per cent. of carbonate of lime to the soil, a ploughed depth of 4 inches, receives 960 cubic feet of marl, or 320 hectolitres; which would furnish, for more than 60 years, an annual consumption of 5 hectolitres of carbonate of lime. At the end of 40 or 50 years, the first dressing, enfeebled, would demand a second marling, which would be sufficient, if, at most, of half the amount of the first dressing.

The dose of marl which we advise as seemingly the most suitable for our moist soils, might then [for the dry,] according to circumstances, with much economy, be lessened by half—perhaps by two-thirds; it would still be almost triple the dose that is applied in Sologne.

We are far from admitting that all the calcareous compound disappears in the interval of time, which separates the successive marlings. A part of it is carried away by the waters—another part buried by deep ploughing—and a still greater part enters into new combinations: but still there certainly remains a part at the end of the whole period.

The formation and the products of vegetables, on a hectare of limed land, of which the products are comparable, do not take up, as we have seen, but half a hectolitre a year.† We think then, that with the doses of the first and second marlings, which we still advise, rather than with those of the limings, the soil will arrive at containing such an amount of calcareous principle, that nothing will be gained by augmenting it; and which will

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a merely sufficient dressing—and on the contrary, marled land is enabled much better to resist the injuries of drought, as well as of moisture,

* See M. Puvis' Essay on the use of lime, in Nos. 6 and 7, of the Farmers' Register, Vol. III.

† Rather less than 6 bushels to the acre. See the exact measures of the hectolitre and hectare, and compared with the bushel and acre, p. 363, note, Vol. III Farmers' Register.

‡ This is a mistake of calculation, which is not a little remarkable, to be made by our author. The hectolitre is a measure of capacity—and the lime is measured by it in the stone, not slaked. Of course, though *weighing* less by about two-fifths, than when carbonate of lime, or before being burnt, it does not measure less on account of being deprived of its carbonic acid. But though reached by incorrect reasoning in this particular, the author's conclusion is sound, that a certain quantity of lime given in marl, is just as fertilizing as if given alone, or in any other form. The usual difference in favor of the early action of lime, is owing to its more perfect separation of parts, and its quicker diffusibility through the soil.

† See p. 390, Vol. III. Farmers' Register.

prevent a renewal being required for many generations, during which the whole system of marling will be forgotten. Then, after the exhausting of the calcareous principle, and after the need of it being long experienced, marling will be recommenced as a novelty. Our soil and our country in which these operations had place in very ancient times, have seen, I think, such periods to pass, and to be renewed.

It may be conceived that, by the annual consumption of lime by growing plants, it may happen that soils to which nature had given a small proportion, may cease to contain it in their upper layer. But the period which will remove their lime, is, doubtless very long. A deeper ploughing may bring back to them, as much as a succession of generations was required to take away. Besides, we think that, especially on calcareous soils themselves, the soil and vegetation may form a part of this proportion of the calcareous principle, [taken up by growing plants,] which they spontaneously form entirely in soils not calcareous, as we have seen when treating on lime.

Exhaustion of the soil by marling.

When on a light or very dry soil, a heavy dressing of marl has been laid, and there is not given to it animal [or other putrescent] manure in proportion to the products taken off—and still more when the crops are of an exhausting kind—the products are found to be gradually diminished. The land preserves the principal characters of calcareous soil—but of the calcareous soils of little fertility. It still produces more than before the marling—but it is said to be exhausted, and a new dose of marl does not being back its former fertility. We have seen this case to occur in Isere, where all unfavorable circumstances are found combined. In clay soils this result would be produced with more difficulty, and after a long time. Marl then does not make dung unnecessary—but still it is far from exhausting the soil. To the contrary, we think, that to maintain the continuance of heavy crops, a much less amount of putrescent manure is required, than to obtain the like products from soils not marled. The marl then doubles the action of the putrescent manure—they reciprocally support each other—and the land of middling quality acquires this advantage characteristic of good soils, of being able to produce much, with but a moderate quantity of manure.‡

Nevertheless, we ought to say that the first marling, and the new liming, create a first spring of fertility, which is not afterwards sustained in its full power. That this should be, it would be requisite that, the same year of the marling even, the putrescent manure should have been applied as usual; or that the marl should be given in compost, without lessening the amount of other manure, as is done in many second marlings in England. But this procedure rarely takes place: every where, the farmer chooses to profit by the new faculty given to the soil, of producing without dung—and therefore places his putrescent manure on other ground which has not yet received marl. However, Belgium, the department of the North, Normandy, La Sarthe, and a great part of England, have with care, sustained the first fertility given by marl or lime; and that result is due both to the quantity of manure, and the good culture given to the lands marled or limed.

Of the cultivation of the soil after marling.

After all that we have said, it will be understood that the culture of the soil, after marling, ought to be conducted with discernment and moderation. The *new* fertility of the soil should be profited by, in economizing the artificial forces bestowed by marling. It is necessary to return manure in proportion to the products obtained, and consequently, to multiply grass and root crops—in short, to direct the new productiveness of the soil, as much to the advantage of manure-making animals, as to the increase of grain crops. Then marl is an immense means of fertility, present, and to come.

For the purpose of arriving at these essential modifications of culture, we would not advise a sudden change in the term of the rotation of crops. Such a change is difficult and delicate, and demands much time and expense—and it may be deferred, or even avoided altogether, if the obstacles are

‡ This is precisely the conclusion reached, though by a different course of reasoning, by the doctrine of the power of carbonate of lime to combine putrescent manures with soil, and thereby preserve them from waste. Marl does not *directly* "double the action of manure"—but it does so effectually *indirectly*, by not permitting any loss of the putrescent matter, and saving the whole for the sustenance of plants.

"Marl particularly suits soils not calcareous, and which are cold and moist, without being marshy. Whatever may be the cause of humidity—whether it be due to an impermeable subsoil, to being on a plain without slope, or to waters coming out of the earth—the humidity engenders an acid which accumulates *humus* (or vegetable mould:) the earth there is dormant, [*paresseuse*,] without activity: marl, when there applied, gives to the soil heat and energy, so as in some degree to dry it—uses the accumulated humus, and doubles the effect of the dung which may be afterwards given." *Essai sur la marne*, p, 27.

In this passage of his earlier work, the author fully recognizes the formation of vegetable acid in soil, and a beneficial counteracting action of marl, which would be worth all the other effects which he attributes to it. Yet so little value does he attach to this most important doctrine of acid being found in soil, and which he had correctly then advanced, that no allusion to it is contained in his last edition, of which the translation is here given. If we had met with the passage just quoted, before striving to prove the same doctrine, it would have been adduced as good authority: but the author's subsequent silence, amounting to neglect, if not rejection of it, deprives it of all force, so far as resting on his opinion. Thus it often has happened that agricultural writers have stumbled upon truths of far greater value than those who asserted them knew of, and which were afterwards dropped and forgotten, as easily, and with as little reason, as they had been at first assumed. We may find in detached sentences in agriculture, testimony to support almost any opinion—but the sifting and comparison of such evidences will often show that they are either contradicted by those who had uttered them, or deemed of no importance, even if any definite meaning was in truth attached.

very considerable. In every system of cultivation, crops productive of manure may be introduced, [without altering the term, or the principal characters of the existing rotation.]

When, after a certain period of time, notwithstanding the attention to good culture and abundant manurings, the productiveness lessens—when the dog-tooth, bent-grass, and the plants belonging to silicious soils re-appear—it is time then to recur anew to marl, but to an extent of half, at most, of the first dressing. By this means, with good culture, the first fertility will be sustained, as we have seen done in the countries where the system of agriculture is the most perfect.

Theory of they effects of marl on the soil.

The theory which we have developed to explain the action of lime upon soil, applies nearly entire to marl:* the active principle is the same in both—therefore the results are similar. It follows then, that in marling, as before stated of lime, the calcareous principle gives to soils and to vegetables a greater power of absorption from the atmosphere—of drawing from it the volatile principles, hydrogen, oxygen, azote, and carbon. Marl, like lime, increases then the faculty which both the soil and vegetables have of forming the fixed principles of plants—the salts and earths—whether it be that the elements of these principles are taken in the atmosphere, in the soil itself, or in both. Once being given, this power of absorption would be, doubtless, one of the greatest means by which calcareous agents fertilize soils.†

* See pp. 386 to 390, Vol. III. Farmers' Register.

† The last pages have presented several opinions which are opposed either in appearance, or reality, to views maintained in the *Essay on Calcareous Manures*. To the attentive readers of that work, it may be unnecessary to add any thing in explanation: but to very many others, these doctrines of M. Puvis, would seem to be admitted as sound, if inserted here, without contradiction or comment. But still we cannot for this purpose occupy the space necessary for a full exposition, and which indeed would be but to repeat, and at great length, what has been stated in the work just referred to.

In addition to objecting to the amount of the first dressings of marl, recommended by M. Puvis, we deny the necessity of their being repeated, on his ground of the dose being exhausted by the several causes which he has named. Considering that a proper dose of lime (in whatever form applied) becomes chemically combined with the soil, we deny the power of rain water to carry it off, or to sink it below the upper soil—or that any thing else can take any portion of it from its combination with the soil, except the power of vegetation, which takes up the small portion necessary to form and perfect plants. This one cause of waste was admitted in the *Essay on Calcareous Manures*. M. Puvis estimates its amount at half a hectolitre to the hectare, which is a trifle more than half a bushel to an acre. Dundonald estimated the same at 80 pounds of calcareous matter to the acre. Both estimates are no doubt made on very uncertain grounds. But *something* certainly is so lost, in all the vegetable products carried from the land. Proceeding on M. Puvis' estimate, it would require 300 crops to be entirely removed, to exhaust an acre of 150 bushels of the carbonate of lime previously applied. But if all the offal product of the field had been brought back, in the shape of manure, half of this loss would have been replaced, so as to require 600 crops to take all away—and the addition of one peck of carbonate of lime annually to each acre, with this manure, or half a bushel without it, would replace the whole actual waste. This admission (or even on Dundonald's larger estimate,) is scarcely to be considered as contradicting the position we have elsewhere maintained, of the permanency of calcareous manures.

Our author's theory of the action of calcareous manures in general, is insufficient. His position that soils and plants can form and produce a portion of the calcareous principle required, is contrary to all sound reasoning, as well as to his own views of the continual and considerable waste of that principle in soils.

Instead of the calcareous matter given to a soil (in suitable proportion,) sinking below the access of the roots of plants, and leaving the upper layer of earth more destitute than the subsoil, the contrary result is derivable from reasoning, and is sustained by the actual condition of natural soils. Even if the calcareous matter (by possibility,) was actually below, and the surface soil was nearly destitute of lime in every form, the roots of the growing plants would continually draw up what is so necessary for their healthy support. The roots of grasses might not penetrate very deeply—but those of trees would seek and draw up the lime from 20 feet of depth. The greater part of this lime would be carried by the sap to form part of the plants above the ground—and their death and decay would leave it on and near the surface. Thus, in soils scantily, or but sufficiently, supplied with lime, nature is continually working to keep the supply at and near the surface. Hence the formation of what is called *soil*, and its fertility—and also the general sterility of the subsoil.

But notwithstanding these and other objections to the theory of M. Puvis, and to those of his opinions made erroneous either by being deduced from his theory, or by his relying on the incorrect statements of other persons, his views and his facts are regarded as generally and strongly sustaining such as we have before presented—and it is cause for much gratification that support should have been found to such extent, and proceeding from a source so much entitled to respect.

DESULTORY REMARKS ON THE MAKING OF TOBACCO.

Greenfield, Nottoway, Feb. 12, 1836.

To the Editor of the Farmers' Register.

As you have made considerable complaints of late against your patrons for their neglect in sending their *original* communications to your Register, I have concluded this day to break the ice, as the old saying is—(for there is enough in this county at this time, to fill every icehouse in Virginia; also my ink in the pen has occasionally become ice within the last three or four days,) and to give you some of my own ideas on tobacco.

In the impropriety of indiscriminently cultivating it in those sections of the state where it is made, I am fully aware, that a majority of the growers of this plant will not agree with me; and whether they do or not, it is perfectly immaterial. That shall not prevent me from pointing out those who should make it, and those who should not. I never can believe, taking every expense into consideration, and the almost uniform neglect of other crops, that there has been as much money made from its cultivation, as many have supposed, more particularly within the last thirty or forty years—my reasons are these; in the first place, our land generally is much poorer, requiring in many instances, double the quantity of land, and consequently double the quantity of labor with the consequent expenses. There were also, then much fewer overseers to divide the profits with. Every planter, with but few exceptions, who had from two to eight or ten hands, attended to his own business, and made his sons work, which superseded the necessity of so many overseers. In the present enlightened days of our comparative worn out land, things are very materially reversed. For me to point them out in detail, I am sure would be imposing on the good understanding of your numerous, intelligent, and respectable subscribers. I am clearly of an opinion that every cultivator of the soil, should *consult the nature and disposition of his land, and at the same time, make a proper estimate of the nature and expense of his hands; and proceed to its cultivation accordingly, even if it is only to make black eyed-peas.*

I believe it will be admited by all, that it requires the richest land and the most valuable hands, assisted by unceasing industry and good management, to make tobacco that which will yield a handsome profit.

How many in the present day are there, who possess all the necessary requisites? But few I can answer, when compared to the large bulk of dabblers in the tobacco plant. Within the last two years, there are men actually attempting, and do really think, that they are going to become rich, immensely rich, from making tobacco who scarcely know a tobacco plant from a mullein plant. Vain hope! deluded men!—Where is your land? Where are your barns, and where is your firewood?—If you rent or lease, and hire negroes to work the land at the present high prices of hired negroes, ruin will be the inevitable consequence. It is really amusing to see and to hear many such characters speak of what, they say, they can afford to give for rented land, and hired negroes, to make this precious and all-valuable plant. They speak of making tobacco (for they think and talk of no other staple commodity,) as if they had the command of the clouds. Some of them, to have the appearance of wealth and farming consequence, will employ overseers without showing them their farms; (sometimes they are to rent, and perhaps most of the hands to hire.) What is the consequence? Their bargain with their overseers must be complied with. How is this to be done? Why the employers, to keep up appearances, must (very often) run to every hiring in their reach, to get their number of hands to comply with their contracts. Just such characters have been the cause of negroes hiring so very high this year, so much higher than the nett proceeds of our farms will justify. But they say we are going to make tobacco. Now mark the consequence. These very identical men, nine, I may say, out of ten, at the close of the year, after the proceeds of their crops are ascertained, will not be able to afford their overseers all of their own part, much less to pay the hire of their tobacco-negroes; all of their tobacco-money must be paid for corn and meat, and contingent expenses. It not unfrequently happens that their corn-crib is "rat-proof" by planting corn time, and their meat-houses destitute of the little flies which buz about the first warm season in March, to lay their maggot-eggs. I have seen tobacco sell years past, as high as it does at this time; and as high as it probably will this year. I saw people then lay the foundation for their ruin, and I shall be greatly mistaken, if I do not see them again in the same situation before * * * * * * * * gets the vote of Virginia, for the Presidential chair.

Whilst I am constrained to ridicule the promiscuous and indiscriminate cultivation of tobacco, I am fully sensible there are many, very many planters, getting rich from its cultivation. They are not cutting down, in waste, every little piece of wood-land which they know should be reserved and used *sparingly* for rail timber. They are raising manure and making rich lots—making plenty of grain also, to raise their own hogs and horses without taking their tobacco-money to buy them. They are not running to hirings and giving from *eighty to ninety dollars* for negro men, and other hands in proportion. No, sir, they are cool calculators. They will not run into such *wild speculations*, regardless of consequences. They prefer smaller lots, made rich with fewer hands to work them, than to keep up this great, great appearance of cultivating their tens and tens of thousands of hills of poor land, with a train of high-priced hirelings. They brag not of the immensity of ground they have in cultivation, but they are perfectly satisfied with the fertility of their smaller fields, the good management thereon displayed, and, what is better than all, they are perfectly satisfied with the nett proceeds therefrom arising.

I will now state as briefly as possible, my views on the making and management of the tobacco crop. It will be admitted by all, that the tobacco crop is attended with much more labor, trouble, expense and uncertainty, conjointly, than both the corn and wheat crop. As this is admitted, we should not give it such precedence over the other two staples of life. In the making of tobacco, in the first place, our land should be rich, and well adapted to its culture. We should have good barns affording sufficient room, and quite airy. Experience has taught me that early cutting and curing do not require half the firing as has been recommended by many writers on tobacco; provided, the barns are roomy and airy, and the weather *suitable*. In warm and moist weather even when the tobacco is cured, it should be dried by small fires; otherwise, it will very apt to mould. When the air in dry weather can freely pass between the tobacco while hanging, it seems to impart an invigorating substance quite discoverable in the tobacco. It certainly does in the months of August and September, possess *a curative* process which supersedes greatly, the custom of so much firing. I will admit to cure tobacco in this way requires nearly double the house-room—but the question is, had we not better have this extra room, than to subject our barns to so much imminent danger by so constant firing? The seasons are all-important also, in making good tobacco. Unless we can have them as the growing crop requires, we may not expect to make good tobacco. It must be made good and cut ripe before housing: if not, it cannot be made so afterwards. I would respectfully refer those who wish to know the *very time* when tobacco should be cut, to Mr. Jordan Floyd's treatise on tobacco. It can be bought at the book stores in Petersburg. It possesses much more interesting and useful instructions, than I am able to impart, without being guilty of plagiarism. I shall content myself then by saying, as soon as my tobacco is cut and put on sticks, say from eight to fifteen plants, agreeably to size, it is carried directly to the barn, the sticks hoisted from seven to eight inches apart. Fires are immediately put under it, about ninety degrees temperature, continued at this as near as possible for the first twenty-four hours; then raised to about one hundred and ten degrees, and kept at that until the leaf of the tobacco is entirely dried—which is generally effected in forty-eight hours, if the weather is warm and sultry: I then raise the fires higher, (say one hundred and twenty to one hundred and thirty degrees,) and keep them going until the stem and stalk are perfectly cured; but if the weather is close and windy, I stop my fires after the leaf is cured, and fire no more, unless damp and warm weather should ensue. When we can cure our tobacco in this way, it seems to me, that the leaf ever afterwards, possesses more life and elasticity, than when it is cured by a long continuation of fires. Any time after the stem of the tobacco is cured, it may be stripped, and the leaf, or what is called "passable" tobacco, may be tied in bundles from five to eight leaves, agreeably to size. I then hang them on sticks, putting about thirty bundles, on a stick, which are afterwards hoisted in the barns pretty close together to prevent their coming very high in order; where they remain until in "spring season." Experience has taught me, that tobacco prized from winter seasons, will not do to open late in the spring or summer. It will be uniformly too high, and will most assuredly rot, if not opened and dryed out. Shipping tobacco then should not be taken down, until the arrival of some very warm dry and clear day, when the wind is at the south. If such a season should even take place in March, we may venture with safety; provided that the tobacco is in such order as scarely to prevent crumbling. Tobacco taken down in this order with such a season as above described, will do to prize any winter season afterwards. It will then be able to stand the most severe scrutiny and inspection, of our best Petersburg and Richmond buyers and shippers; all they will have to do is to give us prices agreeable to quality, and not to the "fancy colors"—about which, permit me to say one word or two.

I can well remember when the French people took a great fancy to particular colors of tobacco. It is really laughable to hear the names of the different colors by which it was then called; and the very great and unceasing industry taken by all and every tobacco-maker to excel each other. Some called it the "pie-bald color," some "calico," some "green streak," some "straw color," some "fawn color," and finally, the very best of all, some called it the "hickory leaf color." This was the *consummation* of all colors. In the year 1828, I took a fancy to the fawn color, and like many others, I thought I should get rich from making tobacco. We had writers then on the different colors. I consulted all of them, and became more partial to the *fawn* color-writer. I had a lot of tobacco that year (say four acres, or fifteen thousand tobacco hills,) which had assumed before it was cut, all the variegated color of the most healthy and sprightly fawn. All of this tobacco came in nearly at one cutting. Agreeably to my essay on the *fawn* color, I cut this tobacco, carried it immediately to the best barn I had, regulated it on the sticks, by putting eight plants to the stick, then hoisted the sticks, giving them equal distance of eight inches. Then come the wood, the fire and my thermometer. However it may be unnecessary to name that several hours elapsed before I could begin with my fires, in consequence of having to teach my *attendant* the name of my heat measurer, and the number of degrees (eighty,) at which he was imperiously required to keep his fires going both day and night. I visited this barn during the firing process as strictly and as constantly, both day and night, as a doctor ever visited his patient with typhus fever. On the 16th day about the setting of the sun, my tobacco firer came and stated, that he believed the tobacco was cured, and that the fires ought to be stopped. I directed him to stop them, and bring to me my heat measurer. Upon examination of the tobacco, I found, I had a barn of as beautiful a *fawn* color as ever was seen; but the tobacco had no more *substance* in it, than an *oak leaf* in the month of March. I took great trouble with this tobacco in handling, stripping, squeezing, stretching, packing and prizing; and after all this, sold it in July 1829, in Richmond, for $4.20 per hundred! far less than I got for some "refused:" this broke me of paying so much *extra* attention to the management of tobacco, to the great neglect of the great grain crop. We should however bear in mind that all kinds of tobacco were selling comparatively low at this time, except for manufacturing.

In conclusion Mr. Editor, permit me to state that I have read with no ordinary interest in your valuable and ably edited Register, the several interesting and ingenious pieces on the cultivation and management of tobacco. However, they display no inconsiderable diversity of opinions. They remind me not a little of the five loo-players, who all *stood*, all played, and all got off. They all seem right in theory. To follow the strict directions of these tobacco-writers, is more than many are able to do for the want of the necessary funds to command the hands, and to build their barns, &c. and for them to carry out those theories to their greatest extent: I am pretty sure, many of us would make no corn, raise no hogs, and have no milk and sweet potatoes for our children. All, all (labor) for tobacco. Poverty and starvation would be the inevitable consequence, unless we could do by our tobacco, as Will Boniface of old did by his ale, "live upon it, sleep upon it." That the above writers have reflected much, devoted much time and labor in their several modes of making and managing the tobacco crop, I cannot for one moment entertain a doubt; and that they have realized ample reward for their industrious perseverance and assiduity, I am equally disposed to believe. But at the same time, I presume these gentlemen are wealthy. They have the tobacco land. They have old experienced hands, calculated for little else than to attend to their barns, and the management of their tobacco. The hands are not put in the common stock of hands on the plantation, to assist in making any and every other product appertaining to a well regulated system of farming. These are advantages in managing tobacco, more than paramount to every other consideration. In this old state, I am decidedly of an opinion that the grain crop should not be neglected for that of tobacco. We should make as much grain as will be sufficient to support the demands of our plantations, and as much tobacco afterwards as possible. In my opinion this determination to make the grain, should be our memorable motto. More anon.

P. W. HARPER.

ON THE MANNER AND TIME OF EMPLOYING OVERSEERS.

Saratoga, (Buckingham,)
February 2d, 1836.

To the Editor of the Farmers' Register.

As I have just forwarded my subscription for the third volume of your Farmers' Register, and and not having heretofore given other evidence of the high estimation in which I in common with very many of my acquaintances in this part of the state hold that work, I will now indulge in a few remarks. Being a plain sailing farmer, I have not the disposition to attempt any labored criticism on the merits of the work, or the inclination to indulge in any inflated or ill-timed commendation. I dare say, it will be generally conceded, that, that person renders a more acceptable service, who when he beholds his fellow-man struggling against the difficulties which may surround him, freely contributes his mite to free him from embarrassments, than the individual who seeing the unpromising state of affairs, stands aloft either to detect and magnify blunders; or to cry huzza for those who so nobly combat for the amelioration of the human family, and the advancement of the great fundamental interest of the republic. Without farther preface, I will proceed to place before you, my reflections upon the important subject of having men of information and intelligence, as well as of practical skill to act as overseers—and also, on the expediency of the proprietors of estates entering into a general determination to change the time of employing, or making contracts with their overseers.

I think but few men of observation will deny, that one great cause of the very wretched state of agriculture in the middle section of Virginia, is owing to so large a portion of it being not only entrusted to men of limited acquirements and moderate capacities, but to those also whose interest it is, to aim almost exclusively at present gain, without regard to future consequences. We all know that it is the due combination of knowledge and practical skill, which enables particular individuals to achieve those objects calculated to better our condition; and, that requisitions are as frequently made on the arts and sciences in accomplishing agricultural improvements, as elsewhere. Notwithstanding this fact, and the circumstance of other avocations requiring long study and many years of apprenticeship before they are mastered; it is but too frequently the current belief, that all that is wanting in the farming department, to entitle any one to a decent standing, is to know how his father or grandfather used to manage their farms—and to be able to condemn indiscriminately all innovations on old practices, and stubbornly refuse to borrow light from other neighborhoods or communities.

It is also too prevalent a fashion among practical men to repudiate all agricultural knowledge derived from books, which is about as wise as the conduct of our farmers learned in the sciences, in eschewing the means of acquiring practical skill. The former throw aside books in accomplishing their agricultural operations, and the latter equally as sagaciously, attempt to be practical farmers solely by reading books, devising new theories, and figuring upon paper. It must be conceded however, that agricultural books in the hands of the really ignorant, are rather a disadvantage, for inasmuch as they only know the common rules practised by their forefathers, without having hardly examined the principles upon which they were based, or the particular circumstances which rendered them expedient; they can hardly be supposed capable of understanding the principles of any new subject connected with agriculture, or of possessing capacity sufficient to enable them to modify new rules or plans so as to suit their particular situation. For somewhat similar reasons, it follows, that purely theoretical men would be about as much benefited in having a farm to experiment upon. Then it seems, that the great desideratum necessary to ensure successful farming, is to possess so large a share of information and intelligence, as will enable any one to see what is going on around him, through a proper medium, and to determine, upon proper principles, the fitness and utility of things, while at the same time he has the practical skill successfully to turn the experience and plans of others to his own benefit, whenever in his judgement it may be advisable. Surely one of the highest points for any farmer to attain, is at all times to be able to grasp and wield the knowledge of others. We have frequently seen the immense difference between the judicious and injudicious application of both capital and labor even in the most common pursuits. While witnessing such occurrences, we cannot help being forcibly struck with the incomparable advantages, the well informed must possess over those who rely entirely upon their mother-wit. As for instance, in the case of the farmer who ploughs shallow, and then plants his corn with the rows running directly across his field—and up and down hills and ravines. The consequence is a bad crop, and the land also materially damaged by washing rains, and probably made so ridgy by improper cultivation, as to make it almost impossible to put the small grain in properly—and even after the small grain is removed, the land is apt in such cases to wash out where the middle of the corn rows were. So we find bad management in one case necessarily counteracting the next two or three efforts at good management, and preventing not only the fair returns from the land, but leaving it exposed to injury for years. I heard it remarked once, by a farmer, that he considered the difference between selling a barrel o corn for $5, and purchasing one barrel at that price for the use of the plantation, was equal to $10 in the purse of the farmer. Upon this principle the difference between good and bad management is much greater than is generally believed.

If gentlemen had their funds rested in other property than land and negroes, they would be for getting clever and sensible men to manage and superintend them, but as long as their capital is in a farm &c., they seem to imagine that any dolt can see to feeding the cattle, working the ground, and whipping the negroes. And that it would be somewhat indecent for the proprietor to do any thing farther than pay taxes, pocket what little is made, and play the gentleman. This doctrine suits the taste of many individuals, and might be commendable were it not for the impoverishing effect it has on the purse, and the still greater injury it inflicts on the husbandry of the state. Agriculture, like other occupations, requires a willing and energetic hand to execute, and a sound and clear head to direct its various concerns, to render it either agreeable or profitable. The wish, very frequently, of getting overseers at low wages, induces many farmers to forego other considerations of vastly greater importance. What would be thought for instance of an undertaker of some public-building, who first having procured at great cost the best materials for constructing his work, would then run the risk, by employing an inferior mechanic for some $50 or $100 less than he could have engaged a good one for, of not only having an illy shaped, badly proportioned house put up, but also the hazard of spoiling or destroying all the fine materials that were prepared for the building? As injudicious, (to use the mildest term,) as such conduct would be, yet the farmers are frequently guilty of the like error. It needs no argument to prove how much injury such conduct has imposed on this state. If a man goes to the expense of getting a good farm, good slaves, good stock, &c., why surely he ought to be very particular in getting an overseer possessing all the requisites profitably to manage them. An error in that case not only prevents the annual proceeds from being what they should be, but the capital employed deteriorates, and blunders are made, which generally cost much labor and pains to counteract. In the general, we rarely if ever repent giving a good price for a good overseer, but frequently in our moments of repentance we would cheerfully have given three times the amount, rather than have had a bad manager. True economy therefore requires in this case, that we should look more to the overseer's ability to manage our matters profitably, than to the few extra dollars he may demand for his services. I hope I shall not be deemed an advocate of high wages, except as a contingent consideration. I have thought that a farmer who had property to the amount of $20,000 or $30,000 had better give a good manager two prices, or nearly that, for his services, than a bad one, half wages. That scientific or judicious agriculturists would in the main be decided gainers by pursuing the preceding suggestions, I see not the least good reason to doubt; and I think there is still less cause to suppose that the young or inexperienced farmers would be injured by doing *likewise*. To question the justness of the above remarks, would be tantamount, to maintaining, that a dull razor would shave as well as a sharp one, or that poor land would produce as much as rich.

But few subjects are more deserving of the consideration of the farmers and planters, than the present method of employing overseers. It is the general custom so far as my observation extends for overseers to be busily engaged in renewing their contracts with their old employers, or in hunting out new situations in the months of May, June, and July—some few only defering it till August.

The bad effects of this custom ought after a little reflection to be so apparent to all, as to create a general wish to produce a change. A gentleman employs a "new overseer," he takes place on the farm in November—makes a great effort to put his business forward—forces his teams and hands improperly—works the ground out of order and in the general does but little work in the way work ought to be done. As the spring approaches he must try and be the first to finish planting corn, seeding oats, making tobacco hills, planting his tobacco crop, &c., and for what? Why, if he is forward in the spring—has a great deal of work done—and dashes about to this and that place in a great hurry, he soon gets the credit of being a "tip-top" overseer, which is the consummation in his estimation most devoutly to be wished for. Frequently it happens the overseer makes preparation for two large a crop, which of course is injudicious, as well as is liable to be badly done, or in his great anxiety to be foremost, half prepares the proper quantity. However all this is not to him a matter of much moment. For he has probably a large family dependent upon his exertions, and his employer is independent, therefore he concludes it is proper for charity to commence at home, so he looks only to his own interest. Under this conviction he very naturally takes those steps that will tend the soonest to increase his wages. If the tests of merit rest upon an improper basis, why he says to himself "if the other overseers are weighed by them, and the employers think them sufficient, I too had just as well give into the fashion," therefore he exerts himself to acquire those characteristics deemed important. The time for contracting being at hand, the parties unfortunately cannot agree about the terms for the ensuing year. Well! away goes the overseer on horse-back, in the most important part of the year, riding here and yonder in quest of a new home. In the mean time the employer and his business are all very unceremoniously left in the lurch, till the redoubtable character can procure a place. Some days and frequently weeks being passed off in this way, the overseer then returns to his post, and finds everything in confusion. Grass growing—crops suffering for work—and employer vexed. As one might expect the overseer finds there is more work to be done, than he can well have done. The crop soon begins to fail—some of the stock are killed up—the negroes badly treated—and at the end of the year, it turns out there has been much ado about nothing. The employer if young, quickly concludes farming a poor business, and if old, is apt to turn his overseer off—undergo a great deal of fatigue, or get some lad to attend to his affairs in his stead.

This custom of making bargains with overseers in the months of May, June, and July, holds out as can be easily proven sundry inducements for rash and injudicious management in the commencement of the year, and but too frequently gives room for neglect, waste, and general bad management for the remainder of the year. It puts it in the power of indifferent managers to compete more successfully with the really good, in obtaining business. It has the tendency to induce people to form their estimates of the management of men, by their spring and winter's work mainly. It furnishes pretexts for neglect of business at the most important season of the year. It prevents the employer from forming a correct opinion of the qualifications of the overseer previously to renewing the contract for the second year, because that cannot well be determined till the crop is quite or nearly finished.

To obviate all these difficulties the planters and farmers need only come to a determination of not making contracts with their overseers except in the months of November and December; and of fixing the moving day between the 15th of December and the 1st of January.

Upon a little reflection it seems to me that most people will perceive the benefits that would result from this change. It would be one in my opinion not only eminently beneficial to the farmers, but to the good overseers also—for merit when ascertained is most sure to be rewarded. When we employ a man to do anything for us, we generally like to see how he executes before we give him additional work to do. Now this can only be done in this case by giving the overseers one year's trial, and then having ascertained their merits, we can with propriety continue or discontinue our contracts. By deferring the time of contracting, they will be induced to continue their exertions to give satisfaction and to gain reputation. And as the crop *made*, would be the test of their fitness, they would take more pains properly to prepare the ground, cultivate the crop, and to save it. The good managers would see that a display of skill and industry would be placed on its proper footing, and entitle them to higher consideration, and the bad managers for fear of not only being thrown in the rear, but of being left in the lurch, would also make greater exertions. The time could better be spared in November and December to look out business, than at any other time of the year. The overseers could then see all of their grain crops secured. The farmers could tell better what they could afford to give as wages, and the last of December would be the most suitable time for moving for various considerations, which it is not material to mention at this time.

I am sure if this plan were adopted we should have fewer overseers trifling about in the summer and fall, and fewer turned off. And as they would be stimulated to more industrious habits, we should have more good overseers, and the more good managers we have, the better for the country. This plan would obviate the necessity the farmers are under to a great extent at present of making the two first contracts with their overseers upon the recommendations of other men. It is nothing more than fair and proper that the farmers should not be forced to take an overseer but one year on trial—but according to the present custom, we are virtually forced in many instances to engage them for the two first years, before we have had an opportunity to judge of their qualifications.

In conclusion, it is proper to state, that it is not my intention to lay all the blame to the overseers, or because some are worthless, on that account, to disparage all of them. Like all other trades or professions, among them there are some that would do credit to any cause, while there are others of great inferiority. That there are many honorable, intelligent, and deserving men among them, as well as skillful farmers, I do not question or deny.

Whether or not these hints are worthy of public consideration, I leave it for others to determine. Certainly many expedients will have to be essayed, and great skill be required in working out the various means designed to resuscitate our husbandry. But that every effort may aid in achieving that great and desirable object, and hasten the period when this our native land shall again "blossom as the rose" must be the cardinal wish of us all.

EDMUND W. HUBARD.

From Burnett's Botany.

ON THE VALUE OF COUCH GRASS AS FORAGE.

[The English couch grass, is the same with the wire grass which is such a pest on the best sandy soils of Lower Virginia.]

Of the creeping species, the couch grass of the farmers, which is here regarded as a troublesome weed, is collected on the continent as food for horses. Cattle of all kinds are fond of the underground stems of this plant, which are sweet and wholesome. Sir Humphrey Davy found them to contain nearly three times as much nutritious matter as the stalks and leaves; and it has been stated, on the authority of a French veterinary surgeon, that exhausted and worn-out horses are very speedily restored to strength and condition by giving them, daily, one or two bundles of couch grass of ten or twelve pounds weight each, mixed with carrots.

From Burnett's Botany.

EUROPEAN OPINIONS OF DARNEL OR SPELT.

[The plant which is commonly called spelt in Virginia, and which is believed by many farmers to be produced by the degeneracy of wheat, is the *lolium temulentum*, or darnel, described below. In a former article on this grass, (p. 325, Vol. II.) we expressed surprise at the apparent fact that this grass, which was so great, and still a growing pest, among wheat in Lower Virginia, should not be much complained of in England, where it had been known from time immemorial. This is explained in the following piece; as it seems that a much warmer climate than that of England, is necessary to give darnel that vigor which it unfortunately has here.]

Lolium perenne, or ray-grass, is one of our best, and lolium temulentum one of our worst grasses. Luckily, the latter is only an annual; appearing chiefly among wheat, and then known by the name of darnel. This is generally supposed to be the "infelix lolium" of Virgil, of which he speaks in no measured terms of condemnation. It is not a very common grass in Britain, where farmers are particular in the choice of their seed, but in warmer climates it is a noxious corn-weed, and, with the barren oat, overtops and chokes the wheat, so that Milne thinks it highly probable that the Greek *zizania*, which occurs in the thirteenth chapter of St. Matthew's Gospel, should be rendered *darnel*, which would convey the meaning of the passage more fully than *tares*, and, in accordance with this view, the French always translate it *ivraie*, from *ivre*, drunk. Our partiality for contractions has caused the corruption of the French ivraie into *ray*-grass, one of the names of darnel, although it properly applies to one species only, viz., the lolium temulentum, which is said to possess intoxicating powers. Haller affirms that this species of lolium not only produces intoxication, as its trivial name implies, but that, if baked into bread, or fermented in ale, its administration is attended by very disagreeable, and even fatal effects. It produces headache, vertigo, vomiting, lethargy, drunkenness, and difficulty of speech, and the tongue exhibits a very strong trembling. Seagar further remarks, that a trembling of the body is one of the most certain signs of poisoning by this plant. It also affects with blindness for several hours.

By the Chinese laws—for this plant is found both in China and Japan—it is forbidden to be used in fermented liquors. Some of the intoxicating qualities of factitious beer are said to be owing to the admixture of darnel with the malted barley; and a few years ago, two acres of ground in Battersea-fields were sown with this grain: to what good purpose it could have been applied is unknown, for, though darnel meal was once recommended as a sedative cataplasm, it has long been disused; and, according to Withering, horses, geese, &c., are killed by darnel, and dogs are peculiarly subject to its influence; mixed in small quantities with their food, it is, however, said to fatten chickens and hogs.

In the "Medical and Physical Journal" there are placed on record several cases of poisoning, by darnel, in the human subject. In these, giddiness of the head, pain, and swelling of the limbs, succeeded by abscess and gangrene, were the most prominent symptoms. One of the sufferers lost both his legs. Various othes cases, exemplifying the poisonous properties of this grain, have been condensed in the chapter on this plant, in the new edition of "Medical Botany." This, the only poisonous grass known, is easily distinguished by its two sided spike, and one-valved glume; the glumes being longer than the bearded locustæ they enclose.

ENGLISH OPINIONS OF AN AMERICAN AGRICULTURAL WORK.

At page 511 of this volume, we commented at some length on the *manner* in which the conductor of the British Farmer's' Magazine, that thought fit to re-publish in that work a garbled and imperfect edition of the *Essay on Calcareous Manures.* Since that time, two more of the numbers have been received, in which the re-publication is continued, liable to all the objections first stated. We have not read through the extracts, nor indeed any entire page of them, for the purpose of comparison—but to a general view, it appears that the first edition is re-published entire, with the exception formerly named, that a single short chapter ("on the soils and state of agriculture in the tide-water district of Virginia") is omitted, and also the preface—and these, if not omitted, would have served to show to the English reader the true source, and proper object, of the essay, and would have prevented much of the awkwardness, and apparent presumption, displayed by its appearing (falsely) as an "original communication" in an English periodical; and as if addressed to a class of readers, whom in truth, its anthor had not expected to reach. If a single sentence of proper explanation from the conductor of the journal for which it was thus *borrowed*, had been prefixed, intelligent European agriculturists, and men of science, might perhaps have been invited to examine the work, if by no other inducement than the novelty of transatlantic views on soils and agricultural features altogether unknown in England, and altogether different. But to suppose an unknown American writer to be addressing English agriculturists, through the pages of an English journal, (as would be inferred by every reader of the re-publication,) would mark him as both conceited and presumptuous. We venture to assert, that the views presented in the essay, if fairly considered, will be found no less novel in England than in Virginia. Still, the practical use of calcareous manures there has been long established, and many volumes present instructions for their application, and reasoning, voluminous, if not sound, respecting their operation and value; and every intelligent reader can well conceive that a writer, if addressing English readers, would have adopted a very different form to convey his opposing opinions, from what would be proper in this country, where circumstances and opinions were altogether different, and the practice scarcely existed. But however much reason we may have to complain of the conductor of the Farmer's' Magazine having thus appropriated and disguised our work, and the unseemly and dubious shape in which he has presented it to the British public, we freely admit our gratification that, even in this way, it has been thus extended: and still more that it has been the means of attracting the attention, and eliciting the remarks, of the writer whose incidental review of the portion of the essay which had then appeared, is copied below from the same journal. The reviewer had then seen only as much of the theoretical part, as treated of the first propositions: the continuation of his remarks, which he promises, will be also re-published here, when received. Mr. Towers is the author of the "Domestic Gardener's Manual," and of many articles in different British periodicals, on scientific horticulture, and agricultural chemistry.*

* One of his pieces, "On the excretary powers of plants" was insert d at page 157, Vol. II. Farme's' Register—in which, and seemingly on good ground, he asserted an equal claim to this discovery, the honor of which has been awarded to Macaire. Ed.

Perhaps an apology may be deemed necessary for our inserting so laudatory a review of a work of our own. There are few subjects more suitable to be selected for an agricultural journal, than the exhibition of the opinions of intelligent judges in foreign countries, of the writings and opinions of our own farmers: and this consideration would direct the re-publication of any such review, no matter of what American work on agriculture, or whether the reviewer might have awarded more of approbation or censure. Our individual connexion with the work in question, would not justify a departure from this general editorial obligation: and if the opinions expressed in the continuation of this reviewer on the part of the work which he had not then seen, or of any other intelligent foreigner, should be altogether condemnatory, they will notwithstanding, be here re-published, as surely and as readily. Sundry highly approbatory American notices, and some extended reviews, of the second edition of the *Essay on Calcareous Manures*, have been published in this country—but not one of them has been copied into this journal: because, as these publications had appeared in popular and valuable journals, and were already before a large portion of the American public, it was not necessary, and would have perhaps been indelicate for us to extend their circulation, by re-publication in the Farmers' Register. Yet each of these reviews was fully as favorable as that of Mr. Towers': and among the writers, we will name Jesse Buel, and David Thomas, (whose reviews appeared severally in the Cultivator, and the Genesee Farmer,) whose good opinion and applause deserved to be valued as highly as those of any living agriculturists whatever.

Before commencing the following piece, we will point to some things which particularly deserve attention. The writer asserts in the strongest manner the almost universal presence of calcareous earth, (carbonate of lime) in the soils of England—a fact which was inferred from indirect evidence, and on that ground asserted in the Essay on Calcareous Manures. Another circumstance worthy of note, is, that Mr. Towers is one of those chemists who deny the existence of humic, or geic acid; and has opposed, in a long article in the Quarterly Journal of Agriculture, the recent alleged discovery of that substance. Yet he does not here deny, and seems by implication to admit, the doctrine of acid soils, as maintained in the first edition of the Essay, when it had no support from the discovery of humic acid, as the account of that discovery had not then reached this country.

From the British Farmer's Magazine.

ON THE UTILITY OF CHEMISTRY TO AGRICULTURE AND HORTICULTURE.

By Mr. Towers, author of the "Domestic Gardener's Manual," C. M. H. S.

I do not affect to apologize for the introduction of this subject, at some length, into your pages, because I conceive that, however it may have occupied the attention of practical farmers, upon the urgent recommendation of men and science, it has been misunderstood, and, therefore, unjustly agitated.

I have been induced to resume the consideration, by the perusal of those admirable papers in your two last numbers, entitled *Essay on Calcareous Manures*—by Mr. Ruffin—papers which, I think, contain the soundest truths, and, therefore, may be rendered more practically available than most of the elaborate works that have preceded them. The propositions of the writer require, however, to be impartially examined; but before I attempt to do so, I shall cite a passage from a chemical work, written by that worthy and zealous man, the late Mr. Samuel Parkes, whereby the reader may, at one view, appreciate the object of the chemist, and the weight of the arguments he employs, when he urges the necessity to call his science in aid of the agriculturist.

"Chemistry" (it is observed) "will teach him" (an opulent land-owner) "how to improve the *cultivated* parts of his estate; and by transporting and transposing the different soils, he will soon learn some method by which each of his fields may be rendered more productive.

"The analysis of soils will be followed by that of the waters which rise upon, or flow through them; by which means he will discover those proper for irrigation, a practice, the value of which is sufficiently known to every good agriculturist.

"Should he himself occupy the farm, and become cultivator of his own estate, he must, of necessity, be a chemist, before he can make the most of his land, or put it in a high state of cultivation, at the smallest possible expense. It will be his concern, not only to analyze the soils on the different parts of his farm, but the peat, the marl, the lime, and the other manures, must be subjected to experiment, before he can avail himself of the advantages which they possess, or before he can be certain of producing any particular effect by their means. The necessity of analysis to the farmer is evident from a knowledge of the circumstance, that some kind of lime" *(magnesian limestone)* "is really injurious, and would render land which had been hitherto very productive, actually steril."—(*Chemical Essays*, vol. i. pp. 8, 9,)—Again:

"A knowledge of the first principles of chemistry will teach him when to use lime *hot* from the kiln, and when *slacked;* how to promote the putrefactive process in his composts, and at what period to check it, so as to prevent the fertilizing particles becoming effete, and of little value.

"It will teach him the difference in the properties of marl, lime, peat, wood ashes, alkaline salt, soap waste, sea water, &c., and, consequently, which to prefer in all varieties of soil. A knowledge of the chemical properties of bodies will thus give a new character to the agriculturist, and render his employment rational and respectable."—(*Idem.*, pp. 10, 11.) And in a note—

"Lavoisier cultivated 240 acres of land in La Vendée, on chemical principles, in order to set a good example to the farmers; and his mode of culture was attended with so much success, that he obtained a third more of crop than was procured by the usual method, and in nine years his annual produce was doubled.—From *Lalande's Life of Lavoisier*.

Thus far the pretentions of the chemist are made out; his objects are defined, and it must be admitted that with the exception of one or two points, which, not to be hypercritical, we may safely pass by, science has laid no claim that she cannot establish. Chemists *can* analyze soils, *can* determine the quality and quantity of their component parts, *can* detect acids if such exist, and point out antagonist principles by which they may be rendered neutral, and, to a certain extent, innoxious: thus far, then, the chemist and his science must be useful to the agriculturist; nothing but the most dense prejudice can oppose this admission; and were every farmer to become an analytic chemist, to the extent above referred to, and be able to detect the components of his soils and manures, his mind would be enlarged, his sources of rational pleasure and amusements increased, and his practice removed further from that of the empiric, in proportion as it became based upon philosophic truth.

In a former paper (No. xxxiv., p. 537,) I have endeavored to elucidate the science and operations of analysis: I now find a powerful coadjutor in Mr. Ruffin; and am satisfied that, his remarks and observations under that head of his essay, entitled "*Results of the chemical examination of various soils*," and the processes therein described, are some of the most luminous which I have ever met with. The perspicuity of his description clearly demonstrates that he was familiar with his subject, and the young agricultural chemist may safely follow his steps, and rely upon the general accuracy of his deductions.

Having thus upheld the cause of chemistry I must advert to those points wherein I consider it has less claim to confidence; and these may be shortly exhibited, so as not to burden the subject unnecessarily.

The operations of chemistry have a legitimate object when they are performed upon what is considered dead or inert matter; thus, there is no material substance throughout the range of created things, which, provided it be not endowed with the *vital principle*, may not justly be submitted to the test of chemical agents. It is now admitted by our best philosophers, that chemical action is entirely dependent upon, and identical with, electrical energy; that, in fact, the combination of all substances, and their decomposition, are maintained and effected by electrical affinities. As electricity is the most influential of the great natural agents; being an immediate emanation (I use this word for want of a better term,) from the source of light, the sun, whose rays have been poured upon the world from the commencement of time; and as chemical action is but a manifestation of electric energy, it follows, that every individual thing which can be dissolved, decomposed, or in any way disturbed, so as to cause a change in the arrangement of its constituents, is imbued with with the essence of light. Chemistry, therefore—to say the least of it—is one of the grandest and most comprehensive sciences which the human mind can employ in its researches after truth.

But the vital principle, though it may be, and probably is, connected with electrical action, is not a legitimate subject of chemical experiment; and those chemists have erred who have attempted to discover its nature by chemical agency. *That which destroys life*, or interferes with the vital functions, can neither tend to elucidate the nature of the one, nor discover the causes of the other. The principle of life, whether it be that of animals or of vegetables, appears to be directly antagonist to chemical energy; no one, therefore, can be justified in attempting to interpret any of the phenomena of vegetable life, by the application of chemical principles. Chemists, then, it appears to me, have weakened their own cause by endeavoring to prove too much: we know nothing of life, we consequently cannot interpret its phenomena, or refer them to those agencies which are called into action by its extinction.

Scientific men have also laid themselves open to reproof, or even reproach, by their speculative reasonings upon the practical operations of the farmer. In the laboratory the chemist moves in his own appropriate sphere; there he can, and ought to, investigate the substances which nature has rendered the matrix of her vegetable productions; and thence, he may diffuse, in every direction, a knowledge of the facts which his genius and experimental acumen have enabled him to elicit; but he has no right to criticise the practice of the agriculturist in respect to the management of his crops. Abstract reasoning, from deductions drawn from the most refined experiments upon dead matter, can never authorize any interference with the well-grounded practice of the cultivator—of an organized being endowed with the mysterious principle of life. Even in that modern and comprehensive doctrine of the *radical exudation by plants*, which bears directly upon the *rotation of crops*, and interprets its philosophy, the experiments which have detected exuded matters by the test of re-agents, ought to be regarded with suspicious caution, inasmuch as they have, one and all, been performed upon plants placed in unnatural situations, and acted upon by some medium altogether different from that of the soil, in which alone they could flourish, and perfectly develope their foliage and fruit.

It is the duty of the chemist to lay down clear and definite rules, by which soils and manures may be correctly analysed; and if, with an intimate knowledge of practical and theoretic science, he can combine a knowledge also of farming, attained by actual experience—as was in fact exemplified in the person by the renowned Lavoisier, and now by the writings of Mr. Ruffin—he is pre-eminently qualified to instruct, and to recommend his principles by the force of example. But in ordinary cases, men of the highest attainments in experimental science cannot command time, or the means, to become extensive cultivators: hence it would always be wise to point out those facts which cannot be controverted, and to let the practical man avail himself of the aids thus furnished, in any way which his good sense may direct. If the farmer be so unconcerned or prejudiced, as to overlook or reject those important instruments of research which are offered to his notice, the blame must rest with himself. Farming is, at the present moment, in a state that demands all the resources which science can furnish. The prices of every product of the farm are reduced to a very alarming extent: but the reduction, though great, bears no comparison with that of almost all the preparations of the manufacturing chemist. Yet the extension of his science has enabled him to bear up with a bold front against a depreciation of two, three, perhaps four hundred per cent.; and now to produce, with a remunerating profit, chemicals of a quality far superior to those which his predecessors sold at an enormously high price. Farmers, therefore, while they feel and admit the necessity to adopt every economical measure to insure increased produce, ought to regard the chemist and his art with reverential deference. Even the simple perusal—by a man of discernment—of the "*Electrical Researches*" of the amiable and accomplished Faraday, is amply sufficient to prove, beyond a doubt, the scientific chemist to be a person of superior order; one to whom the revealment of the wonder-working secrets of nature is intrusted; and his art, the grandest, the most sublime treasure that could be conferred on any created being. That science, legitimately directed, is well qualified to assist the farmer, and promote his welfare, for it bears directly upon the agents which he employs in the culture of every one of his crops.

One other objection to the general utility of chemistry to agriculture remains to be noticed before I pass to the investigation of Mr. Ruffin's propositions, namely:—it is asserted and freely admitted, that the nature of soils lies open to the investigations of the chemist; but it may too frequently occur, that although experiment can readily detect the components of a soil, point out an antidote for any deleterious substance which may be traced therein, and show that in which it may be deficient, the substance required, either to correct the evil or supply the deficiency, may not be at hand. Thus, a soil may superabound in sand, or exhibit a poisonous salt of iron; but alumen or pure lime may be unattainable, unless at an outlay which would neutralize the benefit to be derived from the use of either. Fortunately, however, science can go a considerable way towards procuring an artificial remedy, and thus tend to supply the deficiency of the natural one; but as I must recur to this subject hereafter, I shall not dwell upon it now.

It is somewhat unfortunate that the "*Essay on Calcareous Manures*" was written expressly for America. Mr. Ruffin, it is true, makes frequent allusions to the theories and experiments of British chemists; but his own observations and analyses apply purely to the soils of the United States—to that part at least of which he observes, "no chalk is to be found in our country, and it is only from European authors that we can know anything of its agricultural characters, when nearly pure, or when forming a very large proportion of the surface of the land."

Mr. Ruffin's arrangement, however, of the three principal earths, is clear, precise, and correct; as is also his general conclusion at the end of the before mentioned page, viz.—"the mixture of the three earths, in due proportions, will correct the defects of all; and with a sufficiency of animal or vegetable matter, putrescent, and soluble in water, a soil is formed in which plants can extend their roots freely," &c. &c.

But he, perhaps, labors under an error in supposing that all the earths, when pure, "are entirely barren; or that *chalk*, alone, could give them the fertilizing principle." The only soil which I have ever met with, that has appeared to be wholly destitute of calcareous matter, (or, at least, that which affords no trace of it to the muriatic acid test,) is a black bog peat; but in this soil, a few plants will grow with extreme verdure. It does not appear to me that the absence of calcareous earth is the sole cause of the general sterility of turbary soils: I refer it to the situation in which they are originally produced, and in this point, a remark made by Mr. Hayward will apply very pertinently. In the paper on the *Food of Plants*, which precedes *the Essay*, and in the middle of page 197, it is observed: "if a quantity of the leaves of trees be collected, and immersed in a cistern or pool of stagnant water, and permitted to remain undisturbed for three years, they will be decomposed, and in appearance will be in that state which, placed on the surface of the earth, should form a fertilizing substance; yet it will be found so steril, that no plant will grow in it."

Now the true peat mosses are formed, in the large way, in a manner analogous to the earth of decayed, immersed leaves, above described; that is, a bulk of vegetable matters is burried, and becomes sudden under water. Now leaves, and, indeed, vegetable substances in general, if burnt, yield a great abundance of *carbonate ef lime*, as indeed, Mr. Ruffin asserts: therefore, though it may be presumed that, while in a growing state, these substances contain no *chalk*, properly considered as such, yet the elements of that earth must exist in them, otherwise it could not be revealed by the action of fire. Inert vegetable soils then, may originate in the peculiar action of water upon them, while they are deposited in a situation from which atmosperic air is excluded. This, too, accords with Mr. Hayward's idea, and it appears to be well founded. One of the most energetic loams which I have ever tested, contains merely a hint of *carbonate of lime;* it is of a fine, ochrous color, a velvety, unctuous texture, and when washed by various effusions of water, yields nearly three-fourths of its bulk of impalpable matters, the remainder being a moderately fine silicious sand. When muriatic acid is applied to the fine matters, it produces little effervescence, and detects scarcely two per cent. of chalk. This loam is applicable to almost every species of plants; far more so than many earths which contain three times the proportiou of chalk named, with double the quantity of warm sand. But if calcareous matter be the principal meliorating medium, the quantity required must be small indeed, if that in the loam just alluded to be sufficient to establish the fertilizing principle.*

* This soil, containing "scarcely two per cent. of chalk," is abundantly calcareous to have acquired, and to retain all its fertility, according to the theory maintained in the Essay on Calcareous Manures. Any quantity, however minute, of *carbonate* of lime found naturally existing in a soil, proves that there had been enough for its use and benefit. The author of the Essay was far from maintaining that the proportion of *carbonate* of lime found in any soil, was the measure of its fertility. The quantity originally given to soils, by natural causes, when not excessive, and under like circumstances, might have served to measure the pow-

The first proposition of the Essay refers chiefly to the hypothesis that, "soils naturally poor, cannot be permanently enriched;" and, "that the labors of man have been but of little avail in altering the characters and qualities given to soils by nature."

In as far as this view extends, I heartily assent to the opinion of the essayist, and upon the ground which I, for some time, have assumed—that, "soils, be their nature what it may, tend to reduce manuring substances to earths of their own precise quality;" and, in accordance with this doctrine, I hold it highly probable that the ultimate end of manuring is to support and maintain the quality and bulk of the staple soil.

Earth may be gorged with manure, but it is not thereby enriched. Plants may be rendered richly luxuriant in a gorged soil, but their health and vigor are not thereby increased. A medium state of soil, wherein it contains a proper quantity of enriching decomposable matters, is most favorable to healthy and robust vegetation; and in it those matters soon disappear, and nothing but earth remains after a few crops have exerted their energies upon the soil. Any one who has witnessed the effects of sand upon a very liberal supply of manure, after a crop has been taken, will not be at a loss to determine what the terms "barren" and "hungry" mean, when applied to land. Strong loams, on the contrary, hold the manures unchanged for a considerable time when not cropped, and retain the active principle more tenaciously by far than light sands, even when severely cropped. Now it is certain that, every correct analysis has proved the convertibility of farm-yard manures into, not only the elements of vegetables, but also into the three staple earths themselves: if, then, a hungry sand, after a liberal system of manuring for years, still return to its original state of poverty, what must have become of the *alumen*, the *carbonate of lime*, and the *oxide of iron*, which the manuring substances were capable of yielding under certain conditions, to say nothing of the oxygen, the hydrogen, the carbon, and the azote, all of which gaseous products may be presumed to have been taken up by vegetable, vital action.

Every fact that I am aware of, seems to prove—first, that vegetable action tends to decompose manuring substances within the soil: secondly, that these substances are either wholly consumed, or deposite a residuum which is precisely similar in character to that of the natural earth, leaving it, whether it be sandy, clayey, or loamy, neither more nor less rich than it was in its original constitution. If this view of the results of manuring be correct, then Mr. Ruffin's first proposition is so far, to all intents and purposes, established.

The second proposition of the Essay unfortunately refers almost exclusively to the soils of Virginia, but one point of it, which is of great interest, is contained in the following lines—"The abundance of *putrescent vegetable matter* might well be considered the cause of fertility, by one who judged only from lands long under cultivation."—"Vegetable matter abounds in all rich land, it is admitted; but it has also been furnished by nature, in quantities exceeding all computation, to the most barren soils we own." The author then proceeds to state that, calcareous earth—by which term he always intends to express *chalk*, i. e. *carbonate of lime*—is "the cause of fertility, and the cure for barrenness."

The arguments are well sustained throughout the remaining part of the Essay, and prove the value and importance of chemical knowledge: they are, however, far too extensive to permit of being minutely investigated, and, indeed, may not be generally applicable to the soils of England. However, it would be highly desirable that particular attention be given to the facts adduced, in all districts where peat mosses exist, or have been recently reclaimed, for therein vegetable remains abound; and though these substances contain the elements of calcareous earth, they also are replete with those of vegetable acids, inasmuch as they are chiefly composed of oxygen, hydrogen and carbon—the bases of all such acids. The presence of acids need not therefore be questioned, though they may not be traceable as such, being taken up and neutralized by the chalk, or alkalescent matters with which they come in contact as soon as they are produced.

The sterility of pure peaty soils, and their incapability of improvement by manuring substances, tend much to strengthen the second proposition, as does the fact, that paring and burning are found experimentally to be meliorating processes of great efficiency; and why? simply, because the agency of fire decomposes the vegetable matters, destroys the acidifying elements, or, to speak more corectly, disperses them in the form of gases, or aqueous vapor, liberates and fixes the carbonate of lime, and a portion of free carbon, and perhaps, (generally,) a little carbonate of potassa also. Here, then, we perceive another proof of the importance of chemical science, for nothing else could ascertain the results of the combustion of the peat, or refer them to their proper causes.

Mr. Ruffin's observations prove the correctness and accuracy of his analysis and conclusions. *All wood ashes*, as I have proved by reiterated experiments, and asserted, *do* contain *carbonate of lime*, and some other neutral and alkaline salts; but whether these saline compounds have been furnished "by the soil on which the plants grew," as he supposes, is to me a matter of some doubt. The *roots* are the media which connect the plant with the earth, and the *leaves* expose it to the influence of light and air: of these facts there can be no doubt; but several experiments with the sap of a bleeding vine, have led me to hesitate on the subject of the components of that fluid. I have not been able, as yet, to detect the presence of carbonic acid in it, but future experiments may furnish more decisive evidence than any which have, as yet, come under my observation; still,

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er to acquire and fix fertility. But in the course of reaching that end, the lime is supposed, by combining with vegetable acid, to cease to be the carbonate, and is no longer detected in that form. This soil which Mr. Towers scarcely considers calcareous—or as containing "*merely a hint* of carbonate of time," is in fact better supplied with that ingredient than almost any natural soil in our Atlantic States—not even excepting our limestone soils. Indeed, the only soils more calcareous, are the few and very limited spots on which shells have been deposited.—ED. FARM. REG.

however, I lean to the opinion that, it is by no means from the soil alone that plants derive their specific juices. When we perceive that *aërolites*, containing metallic compounds of a peculiar nature, are formed in the atmosphere; that masses of hundreds of pounds in weight are precipitated from the air to the earth—(admitting the records of these startling phenomena to be founded in fact)—we need scarcely doubt the possibility of the convertion of the elements of water alone into all the specific secretions of plants, through the agency of light and air.

But, be this as it may, the theory of the neutralization of vegetable acids by the carbonate of lime, naturally existing in the soil, is at once bold, novel, and extremely plausible. The whole tissue of arguments adduced, are very ingenious and philosophical; and though they do not apply with equal force to the soils of Britain, are highly important to the philosophical agriculturist.

Nothing can be more correct than the assumption that vegetable matters under fermentation, (which is a chemical change of the constituents of dead vegetable matter, effected by the play of electrical affinities,) produce acetic and carbonic acids, perhaps also the muriatic acid; and these would be taken up in their nascent state by any alkaline substance existing in the soil. Acetic acid would be carried off, were it not fixed by some chemical agent; but if it met with lime or potass, a neutral soluble compound would be formed; such, to an extreme degree, is the acetate of potass, a salt so greedy of water, that it liquifies if it be exposed only for a few minutes to the action of the atmosphere.

Leaves, and most vegetable bodies, affords manifest proofs of the presence of salts, particularly of salts of lime; not that they contain any chalk in its pure state, but they, in many instances, yield it to the mineral acids by mere digestion in them, without having undergone combustion. Thus, while we attest the truth of the chemical law adduced by Mr. Ruffin—that if any combination of lime with a vegetable acid "had been taken up into the sap vessels of a tree, it would be decomposed by the heat necessary to convert the wood to ashes; the acid would be reduced to its elementary principles, and the lime would immediately unite with the carbonic acid," produced by the process of combustion; we feel assured, by the evidence of facts, that mineral acids may attract from *green* vegetable substances the calcareous matters which lie masked among the cells of the plant, in a state of union with some unsuspected acid. I have thus detected, or rather produced, carbonate of lime, by digesting some sorts of moss in a weak cold solution of muriatic acid. I have also found a considerable portion in the leaves of a pine apple, but not to equal that which was yielded after combustion.

The combustion of vegetable remains, as leaves, haulm, sticks, and all such refuse, offers the ready means to furnish calcareous matters and alkali to land that is deficient of those important substances, in cases where it may not be easy to procure them in bulk. Many have objected to the process of burning, styling it a wasteful expenditure of manure; and so it may be considered if a soil be ill supplied with decomposable matters; but it is self-evident that, if farm-yard manure be abundant, and the land of a light friable nature, void of chalk; or, on the other hand, if it be clayey and too adhesive, the products of combustion must offer meliorating substances of first rate quality.

I cannot now dwell upon Mr. Ruffin's observations concerning the original constitution of what he terms *neutral soils*, or notice the changes they may have undergone; these considerations, and others which refer to his remaining propositions, must be, for the present, deferred.

I regard his essay as a masterpiece; he has therein practically demonstrated the importance and vast utility of chemistry. His knowledge of refined processes may, perhaps, as he leads us to infer, be somewhat limited; but he has shown that he knows enough to analyse correctly, to describe accurately, and to apply the principles of chemistry with the best effect.

I trust we shall soon be favored with the remaining parts of his essay, for science owes him much, and its friends cannot but be delighted with the aid she has received at his hands. A few more such papers, widely disseminated through the most influential channels, could scarcely fail to convince the most sceptical, that he who could thus apply to the operations of husbandry the scientific principles which he has acquired, must be, in every way, qualified to make the most of his land, be its quality what it may; and thus to increase his profits while he improves his practice of agriculture, and calls into action the utmost productive power of his farm by a liberal, but wisely directed system of tillage.

G. I. T.

October 21*st*, 1835.

From the Cultivator.

ON PUVIS' ESSAY ON LIME—MENTAL INSTRUCTION, &c.

January 11*th*, 1836.

Dear Sir—I read last evening Gov. Marcy's message, and this morning your last Cultivator. The former I consider excellent, with some exceptions; the latter decidedly the best number you have given to the public. It has less of the conjectural than any other which I have read. It has more phpsical science. By physical science, I mean the revelation of the laws of God. I think you are wrong in your remarks on irrigation. There is an immense loss in not saving the washings of roads. This is one chapter of irrigation. The price of hay at present would fully justify great outlays for irrigation, as practised in England. Your first article is excellent, as far as it goes; but if the writer had read Puvis' Essay on Lime, in the October and November numbers of Ruffin's Farmers' Register,* his reflections would have been nearer up to the time in which we live. We do not understand physical science in the United States. It is far better understood and applied to the arts in France. Lime has fed wheat lands, and wheat has fed man for 5000 years, and it is time the debt was acknowledged. The farmers in the Mohawk valley could afford to pay you

* Which will be published in the March and April numbers of the Cultivator.—Ed. Cult.

half a million of dollars for teaching them the use of lime.

I thank you for your little space to common schools. Why should uot the rising generation be taught the meaning of scientific terms of daily application through life? It would be perfectly easy and practicable. We all neglect our duty to the young. How easy it would be to teach every boy in this state, that portion of chemistry and geology, which is applicable to agriculture.

The results of our school libraries are most cheering indeed. The books are not stolen, nor injured, and are regularly returned, and what is more important, the books are read. These boys, when they become men, will understand your last Cultivator, which is more than can now be said of some of their fathers—but which every farmer *ought* to be able to understand.

W.

FATTENING HOGS—SEED CORN—WOODEN OX-CHAINS.

To the Editor of the Farmers' Register.

Madison Co., Va., Feb. 20th, 1836.

In the last No. of the Farmers' Register, you complain of a deficiency of original communications, and request that correspondents will hasten to prevent a continuance of such a complaint. This request is not the only inducement by which I am actuated in writing, but I conceive it the duty of every subscriber to communicate fully and freely, whatever information he may possess upon the subject of agriculture, whether much or little —for this is the principal source from which the utility of your now valuable Register is to flow. Then Sir, in conformity to this duty, I will proceed to make the following crude, and perhaps, unacceptable remarks upon the topics which head this communication.

The mode which is almost universally practised in fattening hogs, in this section of country, is not only wasteful and expensive, but unprofitable—which will be rendered quite obvious by reference to the 13th volume, 94 page of the American Farmer. But knowing that any effort of mine to cause the adoption of an entire new mode, would prove unavailing, I will therefore, as far as experience and facts will warrant, endeavor to point out what I consider an improvement upon the old plan, in point of economy at least, if it be not superior in many respects. The custom here is, to enclose a piece of land through which a stream passes, proportioned to the number of hogs to be fattened, in which they are confined, and fed upon nothing but corn in the ear, which is thrown in upon the ground or mud once or twice a day, in large quantities. When the corn is first thrown in, upon part of it, the hogs soon satisfy their appetites and become gorged, the remainder is trampled under foot in the mud and filth—this they never touch again and is lost. The plan which I would recommend, is not only more economical, and advantageous to the fattening hogs, but to the whole stock of hogs. It is this: the fattening hogs should be confined to a high and dry spot of ground, a south exposure to be always preferred. Instead of one pen, as is usual, have two of equal size proportioned to the number of the hogs; in the dividing fence between these pens there should be a slip-gap, so as to change the hogs from one pen to the other. The stock hogs should be kept in fields adjoining these pens, so as to be admitted into either pen by slip-gaps made for that purpose. Every thing being now complete, all that will be required, is to change the fattening hogs every three or four days, or as often as is necessary, from one pen to the other, and let the stock hogs have free access to the pen located by the other swine. The corn which was trampled in the mud and rejected, and which would have been otherwise lost, is now turned to account, and is greedily devoured by the stock hogs. This is not only sufficient to keep them in good condition during the fattening season, if the stock is not too large, but it is also beneficial to the fattening hogs to have the refuse corn thus removed, which if suffered to remain, might, by its putrefaction, prove injurious. Nor is this the only advantage, for by changing them from one pen to the other, it adds considerably to their comfort which consequently promotes their thrift. Thus the refuse corn is saved and the whole stock of hogs receive considerable benefit.

The following, I do not give as original or new, but to recommend their utility.

Seed corn—"like will produce like"—therefore in selecting your seed, gather none but the best, and that only from stalks which have borne two or more ears. By adopting this plan you will find, that the quality of your corn will not only be improved, but the product increased.

Wooden ox-chains. Get a gum sapling eight or nine inches in circumference, after being barked, and six and a half feet long—at each end of which, attach a chain, one foot long at one end and one and a half at the other, made as other ox-chains with a ring and hook. These short chains are fastened to the wood or pole by a crooked piece of iron called a nose, precisely like the iron or the tongue of a wagon that confines the breast chains. I have had one of these chains in constant use for several years, no part of which has ever been repaired, and can truly say, that it answers admirably well, both as it regards economy and the purpose for which it was made. The common chain made entirely of iron is more expensive, less durable, and in dangling about, sometimes gets in between the legs of the steers, which occasions both risk and loss of time.

With the most cordial wishes, sir, that the Register may be liberally patronized,

I am, yours,

INCOGNITO.

SOME ACCOUNT OF THE LABORS AND IMPROVEMENTS EXECUTED BY THE MARQUIS DE TURBILLY.

[Concluded from page 682, Vol. III.]

"The ground which I broke up in 1752, was pared and burnt in the same manner as that of last year, and produced an equally good crop. My other corn lands did the same; and I have since continued, and still continue, at the time of my writing this, to break up a parcel of heath, or other waste ground, every year. The success has answered; so that my improved lands now yield me every kind of corn which this country produces. Turkey-wheat, buck-wheat, and millet, have done extremely well in some parts of them; and so have flax, hemp, and other productions suited to the different qualities of the soil. In some places I have sowed, at different times, several sorts of trees, such as the oak, the beech, the chestnut, the fir, and others, all of which thrive wonderfully. I have likewise planted new vineyards, and find them answer perfectly well. All these trials convince me more and more, that the very best way of preparing land, is by burning it, as I have already said more than once. Those who were formerly the readiest to blame my undertakings, now see their error, and commend them.

"During this same year 1752, as well as in the course of the following, I drained several marshes, and improved other pieces of uncultivated ground, which not being of the heath kind, or proper for paring, were broken up, and fitted for their respective crops, whether of corn, or of other plants, as will be more fully related in the second part of this account. I likewise sowed in these, as I had done before in other places, trees of every kind, some of which have succeeded, and others failed, according to the soil, and the manner of preparing it. This also will be more fully noticed hereafter, when I shall speak particularly of the different methods of raising trees from their seeds; and of the means of obviating the three chief difficulties which must of necessity be guarded against or removed, before one could properly set about breaking up any sort of ground; these are, water, stones, and large roots; each of which I have found it necessary to get rid of, before I could rightly begin any of my improvements.

"I endeavored this year to make some progress towards perfecting my instruments of husbandry; my new buildings went on according to the plan I had laid down, and were extended from time to time, in proportion as the products of my enlarged improvements, and the increase of my stock of cattle, required more room. I likewise tried to mend the breed of horses in this country, where their chief fault is, that they are too small.

"My sheep were also of too small a size, and yielded but little wool, which indeed is the case throughout this province. I therefore got from Lower Poictou, in the year 1753, two fine rams, of the large kind, called Flemish; by which means my lambs are much stronger than any other in these parts. Several of the males are almost as large as their sires, and I have give some of them to my neighbors for rams. They have produced a bastard breed, which increases apace, and, though not so large as the Flemish, yields more and better wool than our former breed. I got rid of all my old sheep by degrees, and have now a well sized flock: nor do I doubt but that if I could conveniently have purchased a whole flock of these large sheep, their breed might have been preserved without degenerating, and increased so as to supply the place of our present inferior species: for our uncultivated lands would feed a much greater number of sheep than we even attempt to raise.

"In 1755, I discovered limestome upon my own land. This proved a considerable saving; for I had hitherto been obliged to fetch my lime from a distance of near twelve miles. This stone, if properly searched for, may often be found in places where it is not suspected to lie. It is easily known by putting a piece of it into the fire till it be calcined, and then dissolving it in water. This discovery, in consequence of which I built a proper kiln, has enabled me to carry on my buildings with less expense than before, and is of signal service in affording an excellent manure for my land.

"I began this year to give premiums for agriculture to the inhabitants of my estate. They were instituted the year before; and I had long used my best endeavors to inculcate a general love of industry, and a relish for improvements. My success had induced several others, both landlords and farmers, to follow my example, as well in amending their already cultivated lands, as in the breaking up of new grounds. I assisted them in their undertakings, giving instructions to some, lending seeds to others, and money and tools to such as were honest, and wanted them. The better to encourage them all, I had given rewards every year to those who distinguished themselves most, and allowed my tenants sixteen shillings for every acre of new ground broken up by them: a regulation which still subsists.

"To fix these people in the industrious disposition to which I at length had brought them, no method seemed to me more proper than to take them on the weak side of almost all mankind, interest and vanity. Accordingly, I notified in the month of January 1754, that I would distribute every year, begining on the next ensuing festival of the Assumption, two premiums for agriculture; one, to the person who should raise the finest crop of wheat, and the other to him who should have the best field of rye. Each of these premiums consist in a sum of money, not inconsiderable for the country where it is given, and a silver medal, engraved for the purpose, of the size and value of a crown piece. These were, I believe, the first premiums ever proposed in France for this most useful object; though many have been given for much less interesting concerns. On one side of this medal is a sheaf of corn, with two sickles, a scythe, and a flail; over which are the words, *premium for agriculture*, and underneath, the date. On the other side are my arms, with this inscription round them; *to excite to industry the inhabitants of, &c.* I would not put the goddess Ceres of the ancients, or any emblematical figure upon this medal, because, in the first place, the ignorant peasants would not have understood its meaning, and in the next, some of them might perhaps, hereafter, take it for the representation of a saint, and honor it as such; by which means, what I intend only for an object of utility, would become a source of superstition or idolatry.

"A candidate for these premiums must have at least two acres of land sowed with either wheat or rye: they are given to the finest crop as it stands, to avoid all tricks; and if two crops are deemed equally good, the worst soil has the preference. When both the crops and the soils are alike, the largest extent of ground is entitled to the reward. The inhabitants of the place, in general, meet at the parish church on the day appointed; and, after divine service, choose from among themselves five who are not candidates, to inspect all the fields of corn, and mark those which they think the finest. On the next Sunday or holiday, they make their report to the same assembly. If any one complains that his corn has been unjustly passed over un-noticed, proper persons are immediately sent, to examine whether the complaint be just. The assembly then appoint the same five as before, or others if they please, to go and inspect again, with the utmost care, the fields which they had marked, and to judge which two of them, one of wheat, and the other of rye, best deserve the premiums. On the next Sunday or holiday they declare their opinions to a general assembly of the parishioners, as before; and if no objection be made by any of those whose corn has been marked, this assembly adjudges the premiums accordingly: but if any one of them appeals, other proper judges are immediately chosen, and directed to inspect the spot. On the next Sunday or holiday, till which the decision of the premium is, in this case, of course put off; these last examiners make their report, and the matter is then determined. All the people thus sent by the assembly, are paid at my expense. In consequence of the decision of the inhabitants, the premiums are delivered publicly on the feast of the assumption, after the service at church is over. Those who win them, wear the medal, for a year only, fastened with a green ribbon to a button-hole of their coat, and have, likewise for that time, a distinguished seat in the parish church. These marks of distinction cease at the end of the year, when others succeed to them; but the medal remains the property of the person to whom it was adjudged. He may dispose of it as he pleases: yet, though he is no longer allowed to wear it on the outside of his clothes, there has not been a single instance of any one's selling his medal. They all keep it as a badge of honor.

"These rewards have been productive of so much good, and have raised so extraordinary an emulation among my tenants, that I cannot but advise every gentleman to practise the same method upon his estate. I intend to institute some others, for different productions; and as I am far from having a sufficient number of people to manage all my lands, if the whole of them was under culture, I have long thought of giving gratuities to such as shall have a child within the first year of their marriage, to continue this allowance to them so long as they shall have a child from year to year, and to allot a pretty considerable sum for the family which shall have most children. Some may, perhaps, think these encouragements for propagating the human species odd, and even superfluous: but they will be of a different opinion when informed, as they may be by the ministers of most country parishes, that many peasants are unwilling to get children, or at least do not choose to have more than a very small number, when they might have a numerous offspring.* If my abilities were equal to my will, I should already have formed all these useful establishments. It is generally allowed, and experience has particularly demonstrated it upon my estate, that an increase of culture produces an increase of inhabitants; and that wherever there is room for two, with the means of subsisting them, a marriage will ensue: but at the same time that this means of increasing population is encouraged by a more extensive culture of the earth, I see no reason why proper methods should not be used to induce men likewise to concur in the same laudable end.

"Ever since the year 1756, I have continued all my undertakings, and with the same success as before. Those who saw the condition of my estate when I first came to it, in the year 1737, now scarcely know again a single spot of it; so much is the face of the country changed. My mansion-house, which was formerly surrounded with dreary wastes, vast commons, and unbounded heaths, now stands in the middle of well cultivated fields; my improvements are become considerable both for extent and value; producing all sorts of grain, and natural as well as artificial grasses. I have dispersed in them all kinds of fruit-trees, and divided them into fields of proper sizes, separated by good ditches planted with quick hedges. Alleys of limes, poplars, white mulberries, chestnuts, and various other trees, besides being a considerable embellishment to the whole, afford convenient passes from one field to another, yield food to cattle, and are sown from time to time. I turn every thing to profit; even my driest soils. Many of my marshes are drained, and yield good crops. All my meadows by reason of their great extent, are not yet brought to the state in which I wish to see them; though a great part of them now produces excellent hay. I have mowed some of them twice a year, and hope by and by to do the same to others; for I intend to water them all, by making dams and sluices in the brooks and rivulet which pass through them.

"My vineyards are in good order; and my woods, which are now in regular cuttings, thrive perfectly. Some of these, which I have raised from the seed, have grown so prodigiously, that a stranger would think them much older than they really are. I have made some large reservoirs of water, and several ponds, entirely new, besides repairing the old ones. All these have succeeded, and yield good fish. A quarry of mill-stones, formerly abandoned, now turns to good account, and I have discovered several quarries of freestone.

"I have been obliged to make several bridges over the brooks and rivulet which divide my meadows and marshy grounds, and have carried my roads as far as my improvements extend. Some of these roads lie over hills, which could not be avoided; though others have been cut through, at a great expense. Most of my out-houses, which are pretty spacious for all my cattle and all the produce of my land, with proper buildings for poultry, barns, granaries, &c. are finished; and I have built farm-houses with the stones which it was necessary to take off the lands, in different

* This is the only statement which has yet met our observation of such a practical operation of the "preventive check" to population—and the authority on which this stands, however respectable, does not remove our doubts of its truth. But difficult or impossible as it may be thus to check the increase of population, the contrary effect of increasing population can be easily produced, and has been produced with the most disastrous consequences, by acts of government: and if Turbilli's mistaken but benevolent scheme of premiums for births could have been extended throughout France, it would have worked to produce such horrors as the poor law system has done in England, and will hereafter do in this country.—Ed. Farm. Reg.

parts of my improvements, and settled in them young men, who are now married, and have children. Though my barns are very large, and not few in number, I have the pleasure to find that they would not contain all my last year's crop of corn: a satisfaction which I hope to enjoy still more amply in the next and following years.

"Thus my estate, which formerly yielded scarcely any thing, now affords every necessary for food and raiment. When there, I can, truly speaking, keep a very good table, and be decently clothed, with only the produce of my own improvements. I have no occasion to buy any thing except salt, sugar, and spices. My farmers have followed my example, so far as their means, and the helps that I have given them, have permitted.

"These improvements have, undoubtedly, cost me a great deal of money; but my income from them will soon be proportionably increased; besides which, it is proper to observe, that few lands will require so great an expense to break them up, as mine have done; owing to the uncommon stubbornness, inequality, and unkindliness of the soil: nor will it often be necessary to cut through hills in order to make roads, to lay causeys over quaking bogs, or to erect so many new buildings: though, even if all these difficulties should occur, I would still advise gentlemen to undertake the improvement. If they follow the directions here given, and profit by my errors, so as not to commit the like, I can assure them of success, at a much less expense than it has cost me, who have thoroughly paid for my apprenticeship. I can also promise, that they will lay their money out at better interest, and on better security, in this, than in any other way: besides which, they will have the heart-felt satisfaction of contributing to the prosperity of their country, to the increase of population, and to the enriching of others, at the same time that they enrich themselves.

"I have already said, that when I began my improvements, two and twenty years ago, a third part of the farms in my parish were untenanted, for want of farmers who would rent them; that most of the inhabitants of my estate were very poor, and did not in general, reap corn enough to support them half the year; that they were grown so indolent, that rather than cultivate their ground, which would have afforded them a maintenance, they chose to beg, like vagrants in the neighboring districts. Now their situation is very different, and they are no longer in that deplorable condition. They are become industrious, live by their labor, and beg no longer: they would even be at their ease (a happiness which I shall do my utmost to procure them,) were it not for obstacles beyond my power to remedy. The parish now reaps more corn than it consumes; so that the farmer here is enabled to sell at the very markets where he used to buy. All my farms are tenanted; not a house on my estate is empty, and if I build a new one it is immediately filled; in short the number of inhabitants in this parish, for I have an exact list of all of them, is double what it was in 1737. Such is the history of my improvements, and such are the effects with which they have been attended."

For the Farmers' · egister.

ON TARRING SEED CORN.

King & Queen County, February 19th, 1836.

Agriculture is evidently the source of wealth, energy, and support of every country, and in none should it be more regarded as such, than in the United States. Every thing, therefore, which leads to instruct the farmer should meet with his grateful acceptance, and be looked upon by the community at large as a *public good.* I have frequently observed premiums granted by the various agricultural associations in our country to those persons who furnished them with the most approved methods of husbandry. I do not propose myself as a candidate for such honors, and yet I hope what I have now to communicate will be as extensively useful to the farming interest as many plans already devised. Almost all the tidewater section of our state is emphatically a *corn growing* country; hence, whatever course has a tendency to increase its product and lessen the labor of cultivation, must be deemed valuable. As the season for planting this great staple is rapidly approaching, permit me to suggest a few hints as to the excellent mode of preparing the seed corn.

Every farmer is well acquainted with the trouble and perplexity he is subjected to in re-planting his corn, merely on account of crows, black-birds, moles, squirrels, &c., which are ready (after the severities of the winter) to welcome him to the field as their benefactor. No sooner has he planted his field over than he may begin the laborious and disagreeable task. These *rioters* very frequently, indeed, invariably, by their depredations, cause a great deal of unnecessary labor. This is an evil—and how is it to be remedied? Such a a remedy must beof great importance to the farmer especially, and to the public in general. This is what I design to communicate—and it is as follows:—

I have for several years past previous to planting my corn, put it into a vessel, and put thereto as much tar (made thin by warming it a little, and diluting with three parts water) as would thoroughly wet the whole—then taking it out and mixing some plaster or unleached ashes by rolling them well together, which made it ready for planting immediately. This method has prevented the trouble of re-planting—the coat of tar and plaster being a preservative for the grain, and is a nauseous drug to these troublesome gentry, who so often rouse the anger of the farmer to no purpose. This is a method easily practised, and undoubtedly deserves the attention of the farmer.

If this should prove equally useful to such as wish to give it a fair trial, as it has with those who have already made the experiment, the communicator will think himself abundantly rewarded.

HUGH CAMPBELL.

From Loudon's Gardener's Magazine.

NEW MODE OF GROWING MUSHROOMS.

Not having seen in your Magazine so easy a method to grow mushrooms, for catsup and other purposes, as I have practised for several years, at little or no expense, I take the liberty to send you the following sketch of my plan. The only expense is at the commencement, as it may then be necessary to get a few bricks of the best mushroom spawn: afterwards, enough may be saved every year from the dung, &c.

My plan is this. About the middle of July, when preparing the ground for early broccoli or Savoy, I have some of the best fresh horse dung, that is short, and has not much straw in it, dug in the furrow, under the soil where the row of broccoli or Savoy plants are to be planted. The furrow is filled pretty full of the dung, and trodden rather firm, and a few pieces of the spawn are put in it; the mould is then dug over it, and the digging is continued, until where the next row of plants is intended; which furrow is filled with dung and spawn as the former; and so on, as far as the ground is to be planted, and nothing further is required. I do not use any more dung in this way than would be required for the same quantity of ground if spread regularly over it in the usual way; and the plants grow more vigorously by having the dung under them. I consider that the broccoli or Savoy plants are of great service to the working of the spawn, by shading it from the hot sun and heavy rains.

About the middle of September, the mushrooms come up in the greatest quantities, large and fine. I have this morning (Sept. 21.) gathered nearly half a bushel of large mushrooms from about two poles of ground, planted as above; and have had two or three gatherings before, and expect to have a good many more before the season is over.

September, 21, 1835.

ON THE ABUSE AND PROPER TREATMENT OF WORK HORSES.

To the Editor of the Farmers' Registre.

Amherst, *Feb.* 21*st*. 1836.

I was much pleased with a communication signed W, from Charlotte, in the February No. of your useful and valuable journal, on the feeding of work horses. In no other portion of the globe, where that invaluable animal, the horse, is domesticated, is he more esteemed, more lavishly fed, and yet at the same time, more cruelly and shamefully neglected, than in Virginia, east of the Blue Ridge—and I am always pleased to see any effort made to meliorate the condition of this faithful and steadfast friend of man. It has been frequently a matter of astonishment to me, that the Virginians, with their proverbial fondness for the horse, (to say nothing of his acknowledged and indispensable value) should always have been, and continue to be culpably ignorant or negligent in what I will call horse-husbandry. Nine men out of ten pay no kind of regard either to his comfort or his nature. He is treated more as a machine made of wood or iron than as a living being. In winter he is exposed in wretched hovels to the "peltings of the pitiless storm," and in summer he is imprisoned in the same miserable gaols, to inhale the noxious stench and *malaria* arising from the putrescent excrement and filth of his stall. After a hard day's work, or ride, the unthinking (not to say unfeeling) owner (or brute) alights from the back of this faithful and jaded friend, and instead of going to his stall—in person attending to his food—seeing that it is neither too much nor too little, and of the right sort, and causing his stiffened joints to be rubbed, and the perspiration and dust to be curried from his skin and a soft bed thrown down, upon which the wearied creature may repose and resuscitate himself for the morrow's labor, as common gratitude and *interest* both would suggest, this submissive and uncomplaining servant is coldly consigned over to the tender mercies of the slave; and too frequently, after a day perhaps of unprecedented labor, spends a night of corresponding inquietude and misery. No wonder then, that we so frequently see such woe-begone and miserable looking jades tottering along in our teams. No wonder that the horse is becoming short-lived, and, as many farmers think, unworthy of raising; and no wonder that that long-eared, stubborn, ill contrived wretch, that thrives upon beating, the mule, is so fast succeeding and shoving out this noble animal. Your correspondent has well observed, "that the master's attention is half feed." Yes, sir, in this word *attention* is comprised, the whole wisdom of horse management; and this necessary attention needs no phrenological bump for its developement; neither need a man "like a poet or painter, be born with it"—for it is so simple that any man, be he white or black, may learn it, or be made to learn it. Were I asked what is the best method for keeping horses in good order? Without stopping even to glance at what kind of food they ate, I should promptly answer *attention*. This is the whole and only secret; for whilst some kinds of food are decidedly better and cheaper than others, yet with *attention* a healthy horse will thrive on *any* food that he will eat. In the first place, attend to your stable—make it a comfortable house—let it keep out the rain and ward off the winter winds. In summer, when the weather is fair and hot, when you take out of harness at night, feed your horses in a lot adjoining the stable (leaving the stable door open in case of rain)—for it is too bad after a horse has labored hard all day, to cage him up in a narrow cell all night; turn him into a lot and let him wallow and walk about and enjoy the cool breezes. At least once a week (for the horse is a cleanly animal) clean out your stalls and throw the litter into your farm-pen. You will add greatly to your stock of year's manure, and infinitely to the health and comfort of your horse. As often as you clean out your stalls (or oftener) make your ostler throw an armful of straw or leaves into each. Water regularly. Bleed not unfrequently. As often as you think of it, if it is once a day, throw a small quantity of salt into the trough of each horse; and, finally, curry and rub in the morning, at noon, and at night; and whatever you may feed on, the increased strength and ability of your horse will amply compensate you for all trouble; and if a *blooded* horse, will be worth two of the best mules that ever were captured in Santer Fe. But the trouble (this great enemy to the happiness of the horse,) although it seems formidable at a distance, when you approach, it dissipates to nothing. Get into the habit *yourself* of attending to the comfort of your horse, and get your ostler or head ploughman into the habit, and he will soon take all the trouble off of your hands. Let your ostler find out, that you are *determined* to have your horses attended to—that you can, at a glance, tell whether they have been rubbed, curried, &c. &c.

as they should have been, and you will have no further trouble than to walk to your stable night and morning and look in. As soon as you *convince* him that this thing *shall* be done, he will do it; for one kind of work is the same thing to the slave as another—and he will do or not do this or any other work *well* as the master permits him.

Of the different kinds of food used for horses, my experience tells me, that what is generally in this section of the country called "chopping," that is, cut-straw and meal of any kind mixed together is decidedly the cheapest, and best general food. It is far preferable to corn and fodder in the usual way. With the horse, as with all other animals, an occasional change is of great service. Our neighbors over the Blue Ridge, whose horses are always fat, make their "chopping" of rye-straw and rye-meal; but we, on this side, who adopt this mode of feeding at all, do not much care what kind of straw or meal we use. For the last three months I have been feeding six horses on "ship-stuff" and corn meal, (half and half) and cut *wheat* straw—occasionally alternating with cut *shucks*; and I find it, if not the best, certainly as good, and cheaper than any other diet I have ever used. By this method, when they are not at work (when at work I give them corn and fodder at 12 o'clock,) my horses cost me a bushel of ship-stuff and a bushel of corn-meal per head per month; the straw I count as nothing. My ship-stuff cost me two shillings per bushel. It is frequently bought at 25 cents. I have not used one pound of blade fodder, and calculate by the saving, to sell fodder to twice the amount I paid for the ship-stuff; and my horses are as fat, or fatter than I ever had them in the winter. After clover comes in, I use little or no fodder—but feed on green or half-cured clover, and but little else; for a horse will frequently leave untouched the corn in his trough, if you fill up his rack with enough green clover to keep him going all night. I cut the clover in the morning, and let it partially *wilt* in the field till night, on which I feed at night and the ensuing day. Were it not so amazingly convenient to toss ten years of corn and a bundle of fodder to a horse, I am sure I should never give a grain of corn in the natural state as long as I live. It is a heating, indifferent food—and convenience and the dread of a *very little* trouble, I am convinced, are the causes which induce the great mass of farmers to persist in it—for whether we consult economy, or the welfare of the horse, we should certainly abandon it. I give my horses a quart of meal and ship-stuff a head, mixed up in half a bushel of cut-straw at a feed, in a square box, made for the purpose, holding fifteen bushels. I mix the corn-meal and ship-stuff together, and at each mixing I crumble up three or four bundles of lug tobacco and mix along with it. This answers two valuable purposes: it neutralizes that predisposition to costiveness, (and conseqently colic) common to horses in the winter season, and which prevents "cuffee" from robbing the troughs, which, whether it be a part and parcel of his very nature, or from a principle of *lex talonis*, (to wrong the master because he considers himself wronged,) he will be sure to do, unless you by some means prevent him, even though you were to give him a bushel of meal and a ham of bacon a day.

The horse is a noble, generous, ill-used animal. He ministers to man's pleasures and wants. In peace or in war, for work or for fun, he is the same docile, subservient, willing, obedient friend—and if, Mr. Editor, these hasty lines, and imperfect description of what I have found to be an economical and healthful diet, can be of any service either to the "gallant steed" or the "galled jade," he is welcome to the half hour I have devoted to it.

R. C.

From the Tennessee Farmer.

SUBSTITUTE FOR THE SPADE.

I have discovered a much easier and more speedy method of digging garden ground, than that performed with the spade, which is merely to substitute in its stead, the common manurefork—one, however, made square at top,for the foot to rest on, would be better. Mine is a coarse 3 pronged fork, the tines 8 inches long, $\frac{1}{4}$ inch wide, and $\frac{1}{2}$ inch thick at the shoulder, and tapering to the point, and 7 inches in breadth, bent as much as a common spade—the handle straight or nearly so, and $4\frac{1}{2}$ feet long. The advantage in working is, that it is easier forced into the ground than a spade, and the upper end of the handle being thrown forward to nearly arm's length, the fork descends perpendicularly into the earth—then, instead of lifting and turning, the process is rather rolling the lump over by lever power, first breaking it loose, then as the handle, with one hand near the end, and the other about the middle descends, the arm rests on the knee, and the forward hand becomes the pivot of a second lever, of less power than the first, and sufficient little forward motion, if the ground is somewhat adhesive, to turn over almost a cubic foot at once. If it inclines to turn backward,s drawing the fork partly out, will generally obviate that difficulty, but sometimes the old method of lifting and turning must be resorted to.

Ground dug in fall or winter, I conclude should be left rough, as presenting more surface to the action of the frost and air, it is in better condition in the spring than if made smooth, though finely pulverized.

Very respectfully yours,

G. H.

Dec. 12, 1835.

From the Farmer and Gardner.

THE RIBBON GRASS AGAIN.

A southern snbsciber writes us the following account of an experiment he has made since the publication of our friend Robinson's essay on the virtues of this grass, in transplanting it in a bog or quagmire, the result of which is not only highly satisfactory to himself, but is entirely corroborative of the statement made by Mr. R. The attention of gentlemen having unproductive marshes or bogs on their estates, should be awakened to the importance of the subject, and they should certainly lose no time in following the example of our correspondent, by carrying out the experiment of Mr. Robinson:

"This grass I have known ever since I was a child. In different sections it has, like other plants, different names—It is called *Ribbon*, *Fancy*, *Fortune*, *Puzzle*, *Ladies*,' and even, I believe, is sometimes called *Witch's* Grass. I am confident you must have seen it, for I am greatly mistaken if I have not seen it in the cottage gardens in the suburbs of your city. It is the grass which many years since was much used on the borders of flower beds, and is in truth highly ornamental. Its general appearance when in a body, is that of deep green, but on examination, each leaf or blade will be found striped with white, yet no two can be found precisely alike, hence it is said by the boys that he who finds two precisely similar has made his fortune, and his lady love shall not refuse her smiles. From the ease with which it is cultivated, more I think than from its want of elegance, it is now generally ejected from the gardens of the rich, but the cottager, who seldom loses his taste for the beauties of nature, yet gives it a place in his little domain, and I doubt not that you will easily find and recognize it in such situations. In our little village, I think I shall procure sufficient quantity to plant half an acre the ensuing spring. You recollect that I did not commence taking your interesting publication until September, though I subscribed for the back numbers. On the night of the first day of Octobor, while watching by the bed-side of a sick friend, I indulged myself during the slumber of the patient, in looking over back numbers of the Farmer and Gardener, and my eye caught Mr. Robinson's publication. Before the sun rose, I went into my garden (for I am not rich enough to object it) and directed my servant to dig up about two square feet of the tufts, and immediately planted it in a morass near my house—a morass subject to occasional overflows by the tide, and one which has hitherto defied all my power to drain or dry, by ditching and dykeing. Though planted so late in the season, it grew apace, and now covers more than twice its original surface. There are even at this unusually cold time, green blades upon it. Some pigs were running in the morass when it was planted, and I observed that although it grew rapidly, they cropped it constantly, and seemed to prefer it to any other food. With that which was growing in my garden, I tried both horses and cows, and they eat it greedily, though it was old and partially dry. It is my opinion that this grass, together with the gama, are much more than doubling the value of southern states. The latter flourishes in dry and almost barren sands, and the Ribbon, (which in honor of Mr. Robinson, we ought to call Robinsine) I have no doubt will be found capable of converting pestiferous marshes into productive lands, and thereby subserve the health as much as the interest of the southern Atlantic States. For the covering which I anticipate from it to the dirty bog near my house, I would not accept any sum that could be offered. Indeed I think a few years must show how much we are indebted to the discoverer and publisher of its value and use, and for myself I am pained that I am unable to express my gratitude only by the feeble use of words.

While planting the grass, a tuft unobserved fell into a ditch, water always stands a few inches, and sometimes to the depth of two feet. In a week this tuft shot up spires several inches in length, and continued to grow until the weather became cold, since which it has disappeared; whether dead or not, the spring will decide. I also cut off some of the spires without root, and stuck them in the mud; they grew off at once, and I drew some of them afterwards, and found they had shot out roots in every direction; but since the cold weather they too have disappeared, but I hope yet to see them burst into life with the returning spring. You will at once say that I am an enthusiast, to make such high estimate upon such slight grounds, and so indeed I am. I know that this is not a fair trial, but it is a trial under every possible disadvantage—the season late, the place a perfect quagmire, so very spungy as not to bear a man without the aid of a plank to sustain his weight; yet here it grew rapidly. I know it bears summer sun on high land, and therefore have no fear for it in the swamp, since I have found it to flourish well in that situation. Should no unforeseen accident intervene, I will next autumn give an accurate statement of the result of my experiment. You may think this is written for publication, but it is not so intended, and yet I am anxions that the value of the *Robinsine* should be known; but I am not a farmer except in theory and in contemplation—my possessions number less acres than my age numbers years, and therefore I cannot be "a teacher in Israel."

From Loudon's Gardener's Magazine.

ON THE MODE OF RAISING MUSHROOMS FROM THE MUSHROOM STONE.

By Mr. James Alexander, Gardener at Maeslaugh Castle.

I have no doubt but you, and many of your correspondents, are acquainted with the mushroom stone; but, as I have not seen it mentioned in your Magazine, I send you the following account of one that was under my care for upwards of two years. It was sent to Mr. Thorburn of Murth, from Calabria, in Sicily, with directions to give it a little water when it appeared dry, which was generally three or four times a week in dry weather: and, in the course of a fortnight after I received it, a couple of mushrooms made their appearance, which grew to be very large; I think, about 9 inches in diameter. They were porous beneath, in place of gill, as in the common mushroom; consequently, they appeared rather to be a species of Bolètus than a species of Agáricus. However, they were of excellent flavor, and the ship captain who brought the stone home told me that it produced three mushrooms at sea, which, he said, were very fine. In three or four weeks after the two above-mentioned were gathered, three or four more came up, and so on, for the first year. The second year it was not quite so productive; and, in 1833, my successor informed me that the mushroom stone was nearly exhausted. I think eight or ten such stones would supply an ordinary family with mushroom for two or three years.

Maeslaugh Castle Gardens, June 16, 1835.

From British Husbandry.

ON PUTRESCENT MANURES.

[Continued from p. 661, Vol. III.]

Compost.

We have already observed upon the expediency of mixing the bottoms and crusts of dung-pies with the other materials of which they are composed when they are turned over; but the quantity may not only be greatly augmented by a larger addition of earth, but, by imbibing the juices of the dung, a *compost* is thus formed of excellent quality in its application to most crops, as well as soils, and especially to grass-land. It has indeed been objected to this, that the mixture of earth increases the size of the dunghill without adding to its virtue, while the expense of carriage is also thus unnecessarily incurred, and that the more manure is reduced to its essence the better. But, although this may, in some instances, be true, yet experience proves that a compost of this nature becomes converted into a very fertile mould, and in some sorts of unkindly land, small dressings are of little benefit. On such soils, portions of pure rotten dung get fast locked up in large clods, and are rendered useless to that crop; but the increase of bulk, by the addition of earth, admits of a much larger heap being applied, as well as of being more readily united with the ground by the plough, so as to render the tilth more manageable. In many cases, the mixture has been therefore found essentially useful; and though the charge of cartage is certainly an object of moment, yet that may be lessened by forming the composts upon the headlands of the fields to which they are to be applied. They may also be put together at any time of the year, which, especially in summer, is of itself an incalculable advantage. The ground should, however, in that case, be previously summer-fallowed, unless it be entirely free from weeds; or a small quantity of quicklime may be added to them, or between the earth and another layer of any other ingredient not so easily decomposed as the dung. The heap then ferments, and in that state it is left until it be completely cooled to the centre. When the heat has entirely subsided, the compost is to be then turned in such manner as that not only the uppermost part shall be underneath, but also that the outward portion be put in the middle, and that the whole be intimately mixed. If any part of the dung be dry, it should be well and equally wetted—if posssible with urine, or with the drainings of the farm-yard—as each layer is removed, and previous to their mixture. The number of turnings must depend upon the state of putrefaction of the dung, as well as that of the turf, if sods or other materials have been added. The proportion of dung, or other putrescible substance, to earth, must be governed by the qualities of both, and by the judgement of the farmer in their selection and use. The following—which has been adopted in Norfolk—will afford a general idea of the mixture of such a compost, when confined to mould and farm-yard dung:—

Mould for the bottom	160 loads.	
Dung from the bullock-yard and stables, a load of each alternately		112 loads.
Mould for the next layer	42	
Dung for ditto		48
Mould for the top and sides	42	
Total	244	by 160=404 lds.

which, after being turned twice over, produced 300 loads of manure, and was intended for 20 acres.*

Another practice prevails among many farmers, which, so far as the production of manure is concerned, has the advantage of allowing the compost to imbibe the whole of the urine in the yard, but which is also attended with the inconvenience of bedding the cattle in a manner which, without great care in its frequent removal, must expose them to much want of comfort. It is as follows:—

Turf, or any other species of earth, is spread over the yard to the depth of upwards of 2 feet, except around the buildings, to the extent of perhaps 6 or 7 feet, which is left as a path. It is then covered with furze,† or fern, if to be had, and laid over with straw, to which the littter from the stables is also added, and upon this bed the feeding-cribs of the store cattle are placed. In this manner the dung is often allowed to accumulate during the entire winter, or until it rises to such an inconvenient height as to compel its removal; it is then either piled in the yard, after being mixed and covered over with earth, and left there until it may be wanted in the autumn, or else carted out to the mixen, and there treated as already stated.

The materials, and the stock thus employed, were in one instance—

591 loads, of 18 bushels each, of earth	7 horses.
10 wagon-loads of subble	7 cows.
11 do. of fern	3 calves,
46 loads, of 36 trusses each, of straw	besides hogs.

The horses were fed as usual, and the other stock had cabbages in the yard. The quantity of manure which they produced, after it had been turned over in the latter end of May, amounted to rather more than 1000 loads of 18 bushels; and the whole expense of cartage in and out, and the labor of turning and spreading, with the cost of the fern and straw, amounted to £45 11s. 10d., which would probably be increased by present prices to about £60.

In another, 136 loads of earth were laid in the yard, at nearly equidistant periods, from November to the end of March, to which were added the following materials, a large portion of which was consumed by the stock:—

* Rigby's Framingham, p. 97.

† The bottoming of yards with furze has been objected to, because, if cut at an advanced period of its growth, it is extremely difficult to decompose. Where haulm and straw are scarce, it is, however, of great use in forming a dry bed for cattle; and when the dung is carried from the yard, the furze may be very easily separated, and placed in another compost with similar matters, or mixed with a small quantity of quicklime, which will soon prepare it for use.

5 wagon-loads of subble	6 working horses.
25 do. of fern	4 cows.
The product of 4 acres of oat-straw	1 yearling and 30 sheep, besides lean hogs, fed on cabbages & turnips.
5 loads of do.	
19 do. of hay.	

The yard was kept littered about 6 inches deep with fern, to soak up the urine, and the dung from the stables and cow-houses was carried out and laid upon it—hogs being the only loose stock allowed in the yard; but the thirty sheep were penned nightly upon fern only in one corner of it. The manure was not therefore trodden by cattle, but was piled up occasionally, as it accumulated, to the height of near 7 feet, when another heap was clamped up. The total amount, after having been duly turned, was 390 loads of 18 bushels (of which the sheep produced 23 loads,) and the whole expense, including the charge of mixing and turning an extra quantity of 70 loads of the dung of a former year—but not adding the cost of the hay—was £25 18s., which might amount at present prices to £35. It must, however, be observed that it contained a larger proportion of dung than the former compost, and that this mode of preparation allows of its being got ready at different periods, without mixing the first portion with fresh dung; so that the first heap was in excellent order for use early in the spring.* Its precise effect upon the land has not been stated; but no farmer can be at a loss to conjecture its value, and from these data the cost of similiar composts can be easily ascertained.

In using turf, or any kind of grass, in the mixture of a compost, it will be proper to recollect that, if taken up during most parts of the summer and autumn, it will not only be found generally impregnated with the seeds of weeds, but that grub-worms, wire-worms, and various other insects, usually select dry banks by the road-side, hedge-rows, or dry pasture, in which to deposite their eggs. When turf, or earth, is carried from such places, and added to the compost without having been previously subjected to the processes of tillage, the greatest care should be taken, either that it be turned up a full twelvemonth before it is applied to the land; or, as we have already observed, that quicklime be strewed between the sods, in order to guard against every chance of their propagation.†

The application of dung

to different soils and crops, though matter of wide discretion to the farmer, is yet a subject which admits of a few general directions.

Notwithstanding what has been already said respecting the practice of those farmers who allow this manure to lie for a long time upon the surface of the land, we however agree with the opposite opinion—that it should be spread the moment it is taken from the cart, and completely incorporated with the soil;‡ for by tillage it becomes amalgamated with the inert particles of the earth, through which means both that and the dung form one substance in the fittest state of nourishment to promote vegetation.* It should not, however, be deep buried in the soil at first; for, though it is the prevailing opinion of many persons, that, by deep covering, the dung is defended from the injurious effect of exhalation—that the roots of plants soon find their way to it—and that it will be raised higher by after-ploughings—yet there are men of accurate observation who, from long experience, have found that, if dung be only just covered, the nearer it is to the surface the greater are its effects in promoting fertility, for then it lies near the roots of young plants at the time when they need the most cherishing aliment. They also declare, that dung never rises to the surface after it has lain mixed for a season with the soil; but, on the contrary, that, as it dissolves in the earth, the solution descends as low as the soil has been stirred by the plough.†

It is another rule in the application of farm-yard manure, among good farmers, not to use a greater quantity at one time than may be supposed capable of producing a good crop; for, although land can hardly be rendered too rich for the production of green crops, yet wheat, barley, oats, and rye have often been so much injured by a profuse supply of dung, that they have run almost entirely to straw. We have lately seen wheat, on good and well-tilled land, in the possession of an extensive coach-master, which has scarcely yielded two quarters the acre, in consequence of the application of stable-dung; and it is well known that a good crop of grain cannot be grown upon a dunghill. It should not, however, be too sparingly administered, for if an insufficient quantity be laid on, it may not reimburse the expense; whereas a full supply will probably have the effect of producing an abundant crop. A medium should therefore be observed; but so much depends upon circumstances—upon the strength of the manure, the nature of the soil, and the intended crop and culture—that no precise amount can be stated. Various calculations have indeed been made by different writers upon the subject, but they are generally so vague, that they only estimate the quantity in *loads*, by which no precise meaning can be defined, for it must depend upon the size of the cart; and even when calculated in cubic yards, the weight will differ according to the state of the manure, though one cubic yard of well-rotted dung may be generally supposed to average about 11 cwt. A well-heaped one-horse cart will carry nearly a ton, and those drawn by two horses about $1\frac{1}{2}$ ton; a small wagon is also commonly supposed to contain two cubical yards, each consisting of 27 bushels, when estimated by strike-

* See Nos. ii. and iii. of the first article in vol. iii. of the Papers of the Bath Agricultural Society; and Holland's Survey of Cheshire, p. 227.

† See Blaikie's Appendix to his Essay on Farm-yard Manure, edit. 1828, p. 27.

‡ Sinclair's Code of Agriculture, 3d edit., p. 220; General Report of Scotland, vol. ii. p. 521; Brown of Markle, on Agriculture, vol. i. p. 398.

* This has been exemplified by the observations of Marshall upon a crop of wheat of 4 quarters the acre obtained from his own farm, after peas, which had been dunged and thoroughly incorporated with the soil; while another field of wheat, sown at the same time, and fresh dunged with fine spit-dung, superior both in quality and quantity, but which had been ploughed in large lumps along with the seed, only produced 2 quarters. Min. of Agric.

† Naismith's Essay on Manures, vol. ii. of the Appendix to the General Report of Scotland, chap. xii. p. 32, note.

measure, and twice as much if heaped; or a proportionate quantity in weight.*

On *strong soils*, farm-yard manure is very commonly applied to a summer-fallow for wheat; and when that process forms part of the rotation, it is the opinion of most intelligent husbandmen that it can at no time be more profitably employed. The season is then so far advanced as to have afforded time for the preparation of the winter dung, which, on clay-land, where green crops are not generally grown, and the practice of summer soiling is not adopted, is otherwise a difficult matter; but when applied to corn-crops, it should be either already decomposed, or, if fresh, it should be allowed to remain so long in the ground, previous to the seed being sown, as to allow of its fermentation being completed; for it will otherwise occasion the growth of weeds, which, if not eradicated, may ripen before the ensuing harvest, and thus infest the land with future foulness. When the operation has been well performed, and the ground has been thus completely cleansed it is then found to be so well divided, that, if minute attention be also paid to the spreading of the dung, it becomes so thoroughly intermixed with the soil as to ensure a greater return than if it had been laid on during any other periods. The practice is also not uncommon of laying it upon clover leys preparatory to a crop of wheat, or of spreading it upon greensward a year or two before the land is broken up; but the advantages of this latter mode have been doubted by some, though many experienced practical farmers highly recommend it.

On *light land*, on which the rotation of crops usually commences with turnips, it has been found by experience that the dung should be well rotted; it is therefore generally mixed twice, in order to get it into a fit state; but, as Swedes are commonly put in the ground by the middle of May, the manure cannot be properly prepared by that time, unless the yards have been cleared during the winter, and much of that which is thus applied is over-year muck. This, when the crop is drilled, is laid as evenly as possible in the hollows of one-bout ridges, which are afterwards split by a double-mould-board plough, which covers the dung, by turning them over, and the seed is immediately sown above it; but when sown broad-cast, it is regularly laid over the land, generally before the last ploughing, though some farmers give it a second stirring. When potatoes are planted, the manure used is almost invariably stable-dung, when it can be procured in sufficient quantity, which is laid in a shallow seed-furrow immediately under—or, in some cases, over the cuttings; but care should be taken that it be put so deep in the ground as to be out of the way of the harrows, or, otherwise, their hold of the straw might occasion the sets to be removed from their seed-bed.

Even when bare fallows become necessary to clean the land, soils of this description are rarely dunged when followed by corn; for they are thereby rendered so open—especially if long dung be used—that the plants are apt to be thrown out by slight frost in the spring, and perish for want of a sufficient hold of the ground. This necessity for the employment of rotten dung not only lessens its bulk, but it must be also borne in mind that the same quantity of straw is not produced as upon rich clays; and although the deficiency of manure thus created may be partly made up by feeding sheep upon turnips, as well as by a smaller quantity being used than upon strong land, yet the exhaustion of light soils is more rapid; they therefore require more frequent replenishment, and no pains should be spared to increase the amount of dung.

On *grass-land* in the neighborhood of London, where the finest meadow-hay in the kingdom is grown, dung of every kind is laid on in all states, both fresh and rotten; and much town-manure, or street-slop, partly in a liquid state, is thrown over the ground in the same condition as when taken out of the carts and barges. It is a cold, clayey district lying on the north side of the Thames, in Hertfordshire and Middlesex, and has been brought to its present fertility solely by the aid of an unceasing application of manure; many of the farmers being under covenants in their leases to lay on a thick coat of stable-dung, thoroughly rotten, in every third year: others apply it fresh—in which state it is said that, 'load for load, it is to the full as good as when rotten'†—and after it has been washed in by the rain, the straw that remains is raked off and added to the dung-hill. There can perhaps be little doubt that dressing the land with dung in a state of fermentation, when diluted with water, is the surest way of im-

* In the General Report of Scotland the quantity of farm-yard manure usually applied to fallows is stated to be from 14 to 20 double cart-loads, of about 1½ cubic yard each—to the Scotch acre—equal, on an average, to about 14 per English acre; and from 10 to 15 for turnips: vol. ii. p. 519—521; which, it may be presumed, includes both light and strong soils.

Malcolm calculates in loads, which may be supposed to consist of a cubic yard for farm-yard dung, on the following soils and crops, per acre:—

	On strong lands.	Medium loams.	Gravels.	Chalks.	Sands.
For wheat	30	20 to 25	25	20	20
Barley	25	20	22	16	18
Turnips	30	20	25	20	20
Clover	15 to 20	15	20	16	16
Sainfoin	—	—	—	20	—
Pasture	15 to 20	15	16	16	16

Together with various other estimates for the separate dung of cattle and different materials. Compendium of Modern Husbandry, vol. ii. p. 19.

† Survey of Essex, vol. ii. p 231.

parting nourishment to plants: and in that view, after the hay has been carried off the land, farmers watch for a change of weather, and, when the barometer indicates an approaching fall of rain, they lay on whatever manure,they possess; but if the season continues settled, the dung remains untouched until about the end of September at which time it is applied while the ground is sufficiently dry to bear the drawing of loaded carts without injury, and when the heat is so moderate as not to exhale its volatile parts.*

In all these cases the product is abundant, because the land, though cold, yet grows good grass, and whatever may be the nature of the manure, sufficient is always laid upon it to secure a crop; but it is only in the vicinity of the metropolis, or in other great towns, and through means of purchased manure, that such a supply can be obtained as that given to the land in question.

The use of compost of earth and farm-yard dung has been used as an argument against its employment upon meadow-land, because of the difficulty of its entrance into the soil, and that pure dung has a more immediate effect upon the crop. Upon land such as that just mentioned the objection is well founded; but upon soils of a loose texture the mixture of earth—particularly of clay—with the dung, by increasing the bulk to be laid upon the land, tends to bind it, and thus giving a firm hold to the roots of the grass, the finer sorts, which either have not strength enough to penetrate the ground, or the seeds of which have lain dormant, suddenly spring up, and the sward is thus improved. Of this a striking instance in point has been related by Mr. Dawson of Frogden, who, 'having occasion to carry a quantity of very fine black loam from a head-ridge of old in-field land, to give the surface-water a free passage, it was laid upon out-field bent-grass-land adjoining, of which it covered about a quarter of an acre fully an inch thick. No grass-seeds were sown upon this new covering, yet white clover and other fine grasses sprung up, and gradually increased upon it; and the bent, upon which the loam was laid, diminished so speedily, that very little of it remained in the third year thereafter.'† It is, however, well known that the effect of dung is proportionately greater upon good than upon bad land, and the difference is still more considerable upon that which is under grass than what is arable; for it is observable that the dung of animals has scarcely any effect upon coarse pastures, but it perceptibly improves those which are covered with the finer grasses, and is of more or less value as herbage of the former or latter description predominates. This improvement is, however, far more sensible when aided by the application of lime, as we shall have occasion to notice when we come to treat of that fossil.

* Middlesex Report, 2nd edit., pp. 236, 237, 377. In the Leicestershire Report it is also said, 'Dung or compost should be laid on meadow-land immediately after the hay is carried off; for as at that time the ground is generally the driest of any time of the year, carting on it will not cut the turf: there is the least grass to destroy; it ensures good aftermath; and the winter rains will wash all the manure into the soil, so that it will receive the whole benefit of the dressing.' —P. 191.

† Farmer's Magazine vol. xiii. p. 69.

There is, indeed, evidently a mistaken practice throughout most parts of the kingdom with respect to the application of manure. The custom alluded to is that of laying it upon land of inferior quality, while that of a superior kind is in equal want of improvement; the better part of many farms being thus in some degree impoverished by attempting to improve, at an evident loss, the poorer parts. Others, indeed, follow the opposite system; but, when justice is done to the land, every part in rotation should receive the manure arising from its produce. There are, however, some rare instances of ground of so rich a quality, that, by laying any manure upon it an injury would be sustained; but, upon the whole, it is an evident fact that any manure whatever—if not of a nature unsuitable to the soil—will be always attended with a proportionately better return when laid upon good, than upon poor land.*

In the spreading of dung upon the land, the common practice is to put it first out of the carts in hillocks, and afterwards to spread it upon the ground. Many farmers, however, take the opportunity of carting out their manure during a frost, and there leaving it in heaps until a thaw. The convenience of this is evident; and perhaps, during that weather, no great damage will happen to the dung, nor can much of its juices be imbibed by the soil: but if thus left, even for a short time, in open weather, the spots upon which it is laid get more than their share of the dressing, for the moisture is imbibed by that part under the manure, whilst the upper parts are dried by the action of the air, and lose some portion of their fertilizing power. Its effect is thus unequal; the crop will vegetate more luxuriantly on those spots, and the harvest will not be uniform. There is also this inconvenience in thus leaving it upon the soil—that, if the land lies upon a declivity, a considerable portion of the manure may be washed out by the rain, and either carried to the lower part of the field, or else lost in the ditches.

Another mode is for both the carter and the spreader to stand in the cart, and shake the manure out with forks; but although this has the advantage of a more ready distribution, yet, if the men drop a forkful by accident, or do not scatter a lump in the manner intended, they cannot stop to divide it, and it must lie where it falls. The repeated stoppage of the horses also occupies much time. Both these modes are therefore attended with inconvenience.

When carefully done the distance to which the dung is to be carried to the field should be ascertained, and such a number of carts employed as will give constant occupation to both the men and cattle: thus, supposing three to be sufficient, then two teams only—of whatever number—are to be worked, one going and the other returning, while the third cart is left standing at the dunghill to be filled, and replaced by the one which has returned empty, the cattle in which are then taken off and harnessed to the other, so that no time is lost. It should be spread immediately, and can never be done at any other time so cheaply. It is, indeed, decidedly the most economical method for the carter to spread it from the carriage; but as he cannot do this with the minuteness which is requisite to separate it completely and spread it equally

* Holland's Survey of Cheshire, p. 243.

over the soil, such a number of women or children, attended by an overseer, should be employed to follow the carts, as will effect this in the most perfect manner. That number will of course be regulated by the condition of the manure, the quantity to be used, and the distance from which it is drawn. The farmer himself, or some trusty person in whom he can confide, should not only determine the number of loads that are to be spread upon each acre, but should carefully regulate the distance which each load should cover, by measuring the quantity of land: this, when it is laid on in regular ridges, is very easily ascertained by pacing them, and summing up the length and the breadth of the ridges; and then it is only needful to direct the carter to make each load cover a certain space—as one load upon one ridge, or three loads upon two ridges, &c. But if it is determined to lay down the manure in small heaps for the followers to spread entirely, in this case, the distance of each separate heap should be paced over and marked.* The regularity of the distribution of manure ought never to be intrusted to common laborers without superintendence. If the carter be employed, unless a boy be given him to drive, the necessary degree of equality can hardly be expected. It may also be sometimes advisable to lay a larger quantity upon one part than upon another of the same field, for the soils may differ; or it may lie upon a declivity, in which case it will only be prudent to put more upon the upper part than upon the bottoms; for, even under the most careful distribution, they assuredly will receive an additional portion, which will be swept from the heights. Care is also requisite, in carting out dung and all manuure, to make the drivers keep on the head-land till they come to the end of the land which is manuring, so as to make each ridge bear its exact proportion of damage; or, for want of such attention, the men, if left to themselves, make roads across from the gate in every direction, to the great injury of the crop.†

Such is the most approved mode in the broadcast manner; but where the drill husbandry prevails, it is by no means unusual to lay the dung in the intervals of these small ridges, as practised for turnips throughout Scotland and the north of England. The drills are in this case generally formed at the distance of 27 inches, or thereabouts, from the centre of each; and by driving the carts along the middle one of the space intended to be manured, the dung is drawn out in such proportions as may be judged necessary. If the breadth of three drills be only taken at a time, the dung stands a better chance of being equally laid in them; for it often happens that, when a greater number are included in one space, the outside drills receive a less quantity than those which intervene. Others, however, thinking that by only taking three drills at a time, the travel of the horses is unnecessarily increased, take five drills into one space; but, in that case, the number of spreaders must be increased, as at least one is requisite to each drill, and unless care be taken in the superintendence, some inequality will occur in the distribution. It is, however, obvious that the labor of the teams, as well as the poaching of the land, will be thereby lessened; and if a sufficient number of spreaders be employed, the work will also be more speedily executed. Women and children, having light grapes, or forks, are strong enough —four are generally found sufficient for what is called 'a head of carts;' and the spreading is adroitly perfomed even by small boys and girls, after they have been a little time accustomed to the task.*

It is obvious in the ploughing down of dung that, if it be not turned down accurately, it becomes partly exposed to the atmosphere, instead of being buried in the soil. Skim-coulter ploughs have been used to obviate this inconvenience, but —especially in the case of long dung—there is great difficulty in preventing it from choking the instrument, thus occasioning a great increase of draught to the cattle, as well as of labor to the ploughman, rendering the land foul, and defeating one of the main objects of good husbandry. It is also, by some farmers, expedient to bury fresh dung so deep below the soil as to allow it to ferment there without being disturbed by the harrows, or even by the shallow ploughing of successive tillage; but independently of the objection which has been already raised against that practice,† it is not, in any such case, found easy to make clean work.

Many attempts have been made to correct this fault, and considerable improvement has been effected in the construction of ploughs, particularly by the Scotch, some of whose iron swing ploughs have gone far towards a remedy of the defect. One lately invented by Mr. Finlayson, under the title of the 'patent self-cleaning plough,' which we shall hereafter have occasion to describe, seems to merit particular attention.‡

As relating to the quantity of *farm-yard dung necessary for raising a course of crops* upon arable land of various soils, and under different systems of cultivation, with the proportion which they are capable of producing, it has been justly remarked by Dr. Coventry 'that ignorance, and wrong notions about the matter, have produced serious errors in practice; and the information concerning it found in books of Agriculture is in general scanty and seldom correct. It is therefore, an object of primary importance to ascertain, as precisely as possible, what are the particulars that merit chief notice on the subject of cropping, the selection of the most proper species, the proportion that should subsist between them, and the most convenient order in which they should be raised.'§

The latter subject, will be duly considered when we come to treat on the rotation of crops, and we have already noticed the average product of land of ordinary culture and fertility;|| but, assuming some admitted facts as data upon which to ground our opinion of the quantity of putrescent manure

* A table, stating the number of heaps or bushels per acre, will be inserted at the close of the subject of manure.

† Norfolk Report, chap. xi. sect. iii.; Marshall's Midland Counties, vol. ii. p. 37; Brown, of Markle, on Rural Affairs, vol. i. p. 399.

* Farmer's Magazine, vol. v. p. 165.

† See p. 259, l. 4.

‡ See Finlayson's Ploughman's Guide, with engravings, 2nd edit.

§ Essay on Manures, by Dr. Coventry. See the Quart. Journ. of Agric., vol. ii.

|| See pp. 253, 254.

which may be generally sufficient for an acre, we nearly agree in the opinion expressed by the Doctor, and collected from many other accounts, that from four to five tons are yearly requisite of that kind commonly prepared, and in its usual state of decomposition, as spit-dung. According to that calculation, it must also be observed that the course of crops is supposed to consist—on light soils, of the alternate plan of corn and green crops—on clays which do not admit of that system, that the holding contain a proportionate quantity of grass-land; and that the quantity of manure should be supplied, not in small quantities annually, but in large ones, at intermediate distances of four, five, or six years. Light soils, in the common course of husbandry, rarely require the application of putrescent manure oftener than once in four years, and in all cases where the clover is allowed to stand during two seasons, it may be deferred without disadvantage for another year. Heavy soils may run six years without it, provided that the land be laid one year in fallow, and that there be sufficient meadow to be reckoned, at least as one crop in the course. It being, however, clearly understood, that—whether on light or heavy land—nothing but grain, seeds, and live stock is to be sold off the farm, unless replaced with an equal portion of purchased dung; that the whole of the green crops, the haulm of pulse, and the straw of corn be used in the most economical manner; and that some of the live stock be either soiled or fattened upon oil-cake: which plan, if carefully pursued on good soils, with capital sufficient to secure an abundant working and fatting stock of cattle, ought, under fair management, to furnish an adequate supply of dung for any of the usual courses of culture.

Having thus submitted to our readers all that occurs to us of importance on the subject of farm-yard manure, we shall here recapitulate a summary of the chief points which we deem particularly worthy of their consideration:—

1. To bottom the farm-yard with furze, fern, dry haulm, or any other loose refuse that takes the longest time to dissolve; and over that to bed it deep with straw.

2. To occasionally remove the cribs of store cattle to different parts of the straw-yard, in order that their dung may be dropped, and their litter trodden equally.

3. To spread the dung of other animals, when thrown into the yards, in equal layers over every part.

4. To remove the dung from the yard at least once, or oftener, during the winter, to the mixen.

5. To turn and mix all dunghills, until the woody or fibrous texture of the matter contained in them, and the roots and seeds of weeds, be completely decomposed, and until they emit a foul putrid smell; by which time they reach their greatest degree of strength, and arrive at the state of spit-dung.

6. To keep the dung in an equal state of moisture, so as to prevent any portion of the heap from becoming fire-fanged. If the fermentation be too rapid, heavy watering will abate the heat; but it will afterwards revive with increased force, unless the heap be either trodden firmly down or covered with mould to exclude the air.

7. To ferment the dung, if to be laid upon arable land during the autumn, in a much less degree than that to be applied before a spring sowing.

8. To lay a larger quantity on cold and wet lands than on those of a lighter nature; because the former require to be corrected by the warmth of the dung, while on dry, sandy, and gravelly soils, the application of too much dung is apt to burn up the plants. Stiff land will also be loosened by the undecayed fibres of long dung, which, although its putrefaction will thus be retarded, and its fertilizing power delayed, will yet ultimately afford nourishment.

9. To form compost with dung, or other animal and vegetable substances, and earth, for application to light soils.

10. To spread the manure upon the land, when carried to the field, with the least possible delay; and, if laid upon arable, to turn it immediately into the soil.

11. To preserve the drainage from stables and dunghills in every possible way; if not applied in a liquid state, to throw it again upon the mixen.

12. To try experiments, during a series of years, upon the same soils and crops, with equal quantities of dung, laid on fresh, and afterwards rotted; in order to ascertain the results of their application to the land. The whole quantity to be first weighed, or measured, and then divided.

The fermentation of farm-yard manure is in fact, a subject of far greater importance than is generally imagined, for on a due estimation of its value mainly depends the individual success, as well as the national prosperity, of our agriculture. The experiments to which we point cannot therefore fail to come home to the interest of every man; they may be made without expense, and without any other trouble than the mere exercise of common observation and intelligence. Leaving, however, aside the discussion concerning the disputed worth of fresh or fermented—of long or short dung—let the farmer sedulously bend his attention to the accumulation of the utmost quantity that it may be in his power to procure. The manner and the time of using it, in either state, must, however, be governed by circumstances which may not always be within his control; and every judicious husbandman will rather accommodate himself to the exigency of the case than adhere strictly to his own notions of what he conceives to be the best practice. In fine, whether favoring the one or the other side of the question, let him collect all he can; apply it carefully to his crops; and then, trusting to events—*'let the land and the muck settle it.'*

[To be continued.]

IS THE CHINESE MULBERRY CAPABLE OF BEING PROPAGATED BY ITS SEEDS?

In our last number (at page 674,) we copied from Mr. Roberts' Silk Manual, the interesting letter of our friend Gideon B. Smith, Esq. who maintains the practicability of raising the Chinese Mulberry from seed, though he prefers propagating it by cuttings. No one is better authority on this subject, and we believe that to no one is our country more indebted for bringing into use this valuable tree, than Mr. Smith. We shall add below, a later piece from the author of the Silk Manual, and editor of the Farmer and Gardener, in which is totally denied the truth of the assertion that seeds are unfit, or unsafe, as means for propagating this tree, because that the seedling plants will vary from the parent stock, like seedling apples. We were the first to make known this European opinion, (in an article translated for the Farmers' Register,) and deeming it both true and important, we have frequently endeavored to impress on those who were about to raise mulberry nurseries, not to trust to the seed of the Morus Multicaulis. In this we certainly had no private interest to serve, either direct or indirect, to which influence Mr. Roberts attributes the objections of some persons to the use of the seed. We have presented before, and shall again, in the following piece, opposing views, as freely as our own—and we should be highly gratified if our brother editor and esteemed fellow-laborer in this cause, can maintain his position—which would be the means of introducing this valuable plant far more rapidly and widely, than merely by the use of cuttings. But though the evidence of Mr. Smith and Mr. Roberts, completely establishes the fact, that the true Chinese Mulberry has been sometimes obtained from seeds, yet we still believe, that in other cases, (as in the Italian experiments,) the contrary result has been found. It may then be believed, that like peaches, the seeds sometimes produce fruit similar to that of the parent tree, and sometimes quite different. Therefore it will be proper and desirable to try the seeds of the Chinese Mulberry, not only for more rapid propagation, but for acclimating the kind in colder regions: but it seems that it would be unsafe to rely on that mode as certain and undoubted. We hope that those who have the facilities will make many more experiments on this interesting question, and be soon enabled to remove all existing doubts and difficulties.

From the Farmer and Gardener.

ON THE PROPAGATION OF THE MORUS MULTICAULIS, OR CHINESE MULBERRY BY ITS SEEDS.

In our 38th Number, after stating the fact that the seedsman of our establishment had failed in obtaining seed of this valuable tree from France, we expressed the hope that the nurserymen throughout the United States, would appropriate the largest of their trees to the purpose of raising seed. Since which we have seen several intimations that the seed of the *morus multicaulis* would not produce a tree like its parent. However sincerely these fears may be indulged in, and we do not doubt they are sincere, we do not believe that they were well grounded; indeed, we do know from the best authority, that the seed of the *morus multicaulis will* produce its *like*; and why should it not? Is it not as distinct a species of the mulberry, as the black, red, or white, or any other? Does not the seed of each of these produce plants identical in all their characteristics with their respective originals? No one will doubt this, because there are a million of witnesses to prove the fact. Then why should we withhold the possession of a like capacity from the morus multicaulis? Is it because the demand is great, price high, and policy might indicate the propriety of keeping up the idea that they cannot be propagated from the seed? The tree is a stranger of some 8 or 9 years standing in our country, wholly unknown to ninety-nine hundredths of our population, and of course the chance of keeping up the delusion that the seed will not produce its kind, is a good one. But the fact stands opposed to the assertion; for trees, the same in every particular, have been raised in this city from seed grown also in Baltimore. If the demand for the trees could be supplied by the means of propagation used at present, then no necessity for a resort to seed would exist; but when the increased and increasing call for the plant, from all directions of our country cannot be met, and there is no likelihood that the supply for ten years, in the old way of cuttings and layers, can be made equal to the consumption, we hold it that duty and patriotism alike point to the course we have suggested. The prosperity of a whole country should not be retarded in its march by any considerations of personal aggrandizement—the growth of a great staple commodity should not be held in check to gratify the cupidity of any set of men.

There is no necessity for sending to China for seed, if our own people are guided by a proper spirit of patriotism. We have the tree here—it has borne fruit, and from that fruit plants of the genuine morus multicaulis kind have been vegetated. What more is asked? Why then should the modes of propagating be confined and limited? Why should not all the mediums of multiplying the plants be resorted to? The seed can be sent by mail, and the tree can thus be made to reach districts of our country that there are no means of sending either cuttings or trees to; and if there were no other reason, that should operate to produce the measure we proposed.

We should really like to know what is meant by those who speak so feelingly through their fears, when they say that it will not produce its like. Do they mean that it does not produce fruit precisely the same as the parent tree? or do they mean, that it will not produce a tree bearing that fine, ample, silky leaf, as large as a plate, for which it is so highly valued. If they mean the former, we reply we care not what the fruit may be, it is the leaf that the worm consumes. If they mean the latter, we meet them at once with a flat denial; and we affirm, that it will produce that large and luscious foliage upon which the silk worm so delights to banquet, and from which such beautiful, glossy, and elastic silk is made.

If we had any doubts as to the morus multicaulis withstanding the severe frosts of our winters, which we have not, for if planted on a high, dry, sandy or gravelly situation, well protected, it is competent to live as long as any other tree. We say, if we had any doubts upon this head, we would resort to the propagation of the plant for seed with the view of accommodating it to our climate, for the experience of the world has long since proved that it is practicable to make the offspring raised in a country grow and survive the ills of climate, even when the parent of exotic origin, could not exist at all. The operation of this principle is not confined to the vegetable tribe; it is equally existent with regard to man—it is the universal law of nature by which the springs of life are regulated.

From the Silk Culturist.

ANOTHER EVIDENCE OF CHINESE MULBERRY PRODUCED FROM SEEDS.

Mr. Editor.—Dr. Eli Ives, of New Haven, has in his garden three *seedling* Chinese Mulberry trees. In the summer of 1833, a small Chinese Mulberry tree in his garden, then, I believe, in the second year of its growth from the slip, produced one berry, which ripened. This was planted in August, and the same season produced the three trees I have mentioned. They have now endured two winters—are four feet high, were very slightly injured by the last winter, and show wood which is well hardened and perfect to the tips of the twigs. The trees raised from slips, though standing within a few feet, were severely injured by the last winter, and show wood which is green, succulent, and badly matured.

I have seen it suggested, that seedling Chinese mulberry trees would prove more hardy than those raised from slips, and I communicate this fact, as tending to confirm that opinion—and also to correct what seems is an erroneous impression, that this tree cannot ripen its seed in our climate.

I am, sir, yours, &c.,

H. C. BEARDSLEE.

Monroe, Oct. 5, 1835.

From the Ohio Farmer.

ON SPAYING COWS.

I have seen several pieces upon the subject of spaying cows lately, and as they performed the operation somewhat different from what I do, I will state what is my practice.

I make a soft rope of hemp which I fix at each end of a crooked piece of wood, like the one used for spaying hogs, only larger. These ropes should be long enough when doubled, so as to form a slip knot, to go over the hocks of the cows and heifers intended to be spayed, and they should be fixed on, and the heifer suspended by means of a sweep, until only the head, neck, and shoulders, rest upon the ground.

I then, with a crooked pair of sheep shears, shear the hair off the belly, just below the udder, (as they hang) large enough to get my hand into, and I then introduce my hand and carry it back to the back bone, and raise my hand until I find the ovary, which I draw out and cut away, not only the ovary, but all the fallopian tube, taking it off close by the horns of the womb. Cutting close, will prevent the cow from going into heat. After I have taken them out in this way, I sew her up with a common spaying needle, but instead of thread, I use buckskin or sheepskin. The advantages of skin instead of thread is, that it is absorbed and does not irritate the parts, like thread. One case that I examined eight days after the operation, was healed and none of the stitches left. I then apply a little hogslard in which there is a small portion of tar, to keep off the flies, if at a season of the year when flies are troublesome.

I prefer performing the operation in the fall or spring. I have spayed them, from eight days old to three years; and have spayed some that were with calf, not being apprised of their situation, until I had opened them. They cast their calves in a few days, and recovered as soon as the others.

I have also spayed them in the side, but find it more troublesome than spaying in the belly; though, after the operation is performed, I have always thought that those spayed in the side, were less liable to accidents than those spayed in the belly. I once had a heifer whose guts came out in consequence of the slipping of a knot. Had such a thing happened with one spayed in the side it would have been of no consequence, as the guts would not come out, if half the stitches were taken out.

The heifer alluded to, was thrown, and the bowels returned, and she recovered. When I first began to spay, (about 10 years ago) I sewed them very loose, according to the instructions I had received—but am now convinced that it is best to sew them moderately tight.

I have usually spayed from twenty to twenty five a year, and my loss has been about one in a hundred.

I have never spayed milch cows with a view of keeping them to their milk, for this can be easily done by keeping the cow from the bull, and always milking all that can be got from the cow, and feeding her well.

The demand for blooded cattle is now getting so good, that I shall only spay the inferior heifers, whilst I find it more profitable to dispose of the best for breeders. Two winters ago, I had forty-five heifers, and selected twenty and kept them for breeders. The balance I spayed and sold this fall (then two years old past) for twenty eight dollars each.

I usually keep my heifers up a day without food before spaying, as it is much easier to spay them when empty than when full. In one case, where a heifer was very full, in opening her, I cut her paunch about half an inch. She got over the operation as well as they generally do. In sewing, I am very particular that the stitches should pass through the flesh inside (the peritoneum) of the belly, and where the animal is very fat, it is best to sew them twice—first the inside skin, (the peritoneum) and after cutting off the thread, (buckskin) sew the outside.

If you think that there is any thing in the above that will interest your subscribers, you can use it.

SAMUEL D. MARTIN.

For the Farmers' Register.

ON THE NECESSITY OF MAKING MANURE.

Charlotte County, Va.,
February 19th, 1836.

A deep and increasing interest for the Register, and of course the farming interest, excites me once more to pen a few lines for the columns of that paper; not that I am vain enough to think any thing that I can say or write will contribute much to the amusement or improvement of your readers—but hoping rather to effect more from the example of *making communications*, than any thing else, to stimulate others to the performance of contributing their mite of information for the "general welfare." With these views and feelings, the hasty remarks herein contained, are now submitted to the planters, farmers, &c. of this, my native state. But before proceeding farther, I wish to say a word or two in relation to a practice now becoming *fashionable*; for it is *fashion* alone that holds the reins, not only of government, but also in our domestic relations. For instance, you hear of a new implement in husbandry, used by a particular farmer; immediately, without examination, without knowledge, the tool goes the round of the neighborhood over which his influence is exerted; and the consequence is, that some half or three-fourths of those trying it are disappointed most sadly; some not understanding the nature of the tool, misapply it, whilst others, making a very imperfect trial, pronounce it a foolish and useless expenditure of time and money, curses the day of its introduction, denounces the inventor as an arrant impostor, and he who uses it, a downright fool. Again; the *fashion* is set, by some notable correspondent, perhaps of the Register, to sign his name, (in *propria persona*,) not thinking there are many persons so *blind* as believe every thing they may chance to meet with in print—especially if there is a responsible undersigner at the close of the communication. Well! the effect of all this, is to induce others to follow suit; and every man who makes a communication, is very careful to write at the bottom his name in fair and legible characters; some, no doubt, make this the *plainest* line upon the sheet: I will not say, the most *important* one. But let us see the effect of this fashion a little more. There are some men so constituted, that if they really believed or thought it would be known who the correspondent was, would suffer all the ink in Christendom to dry up before you could prevail on them even to make their ✗ (mark.) Well! we lose all such communicators; and many who come under this denomination, are as good and practical farmers as any the country affords. But to be out of the *fashion* is the thing looked at; for to all intents and purposes you had as well be out of the world as to be out of the fashion. It has, I believe, been recommended by some, not to publish anonymous pieces. Now, my plan is, to leave the fashions with the belles and dandies; let the old men and plain farmers go along as it best suits their feelings or inclinations. Sometimes you will meet with one going hand in hand with the dandies; but at the same time, believe me sir, his eye, if not his heart, is on some fair miss in her *teens*. I have made, on former occasions, a communication or so for your valuable paper—but did not subscribe my real name, (Simon Pure,) thinking that ——————— was as well known ten miles off as Simon, and knowing the fact that some men would believe every thing they might hear from the old gentleman, whilst others would believe *nothing*—crying out "is not this the carpenter's son?" I concluded to "cast my bread upon the waters." I hope, Mr. Editor, that nothing in these expressions will be considered as having a personal bearing; for such a thing has not yet entered my thoughts—on the other hand, I thank every gentleman for his communication to your paper, whether his real name is attached to it or not.

The particular object of this communication is, to impress on farmers generally, the important idea in all permanent agricultural improvements of *making manure*. I do not pretend to offer any thing new on this part of my subject—but only to keep its importance fully in mind. What is the great object of labor? I answer, to *make much*, and as *much* as is practicable to make, consistent with religion and humanity. Now, how shall we do this? Most certainly by applying our labor on that soil which is at its highest degree of improvement, combined with the judicious application of labor. But there is little or no soil of that description in this region of the world. What then must be done? The answer is, *make it*. But if I were to attempt this, too little of the necessaries of life would be made to *live on*. Why then, make as much as you *can*, consistent with that view of the case. Be sure to *make manure;* for this is the only subject with which the soil can be enriched. Make it, whether from cows, horses, hogs, or sheep; from corn-stalks, wheat-straw, or hay; from clay, bones, or ashes; from blood, suds, or liquor; from peas, beans, or vines; from swamp, or bank; from fowls, or beast; from field or woods; from shell, or stone—*make manure*. Let this be your main object; for without it there can be no advancement of a permanent character in the soil. As for that kind of improvement which lasts but a day, "Simon" is of opinion that it costs more than it comes to. Ask yourself every Monday morning, how much manure was made last week? Can any be added this week? Do not wait for a wet time or a dry time; and of all times carefully avoid what is called "a *convenient time*." It comes so seldom, and is gone so soon, that but little is done in the way of making manure. Enriching land is like putting out money on interest; not however, at the poor pitiful rate of six per cent; but if well managed, it counts up to thirty-three and a third, sometimes, fifty per cent., and occasionally, like compound interest, doubles itself in a very short time. Now all who seek for riches, may rest assured that this is the way—I do not say the only way—for I know of some, who by speculation, trick, or contrivance, have been made rich in a day—but generally such persons soon become purse-proud, and neglect their near and dear relations, who perhaps gave to them the helping hand: not only so, "they forget the God who made them." A great deal has been, can be, and will be said as to the quality of this important article in good husbandry. Whilst it is admitted, that much depends both on the nature of the soil, and manure, as to its proper application, old Simon knows one thing—and that right well—few, or none of us make enough of any kind—that a still smaller number are sufficiently acquainted with the particular quality of manure in its various stages, degrees, &c., to say at what particular time it should be used, or in what particular way applied. I have used it moderately on different soils—clay, sand, mould, new and old, wet and dry—but never yet have I used it in any way that was not more or less profitable. Manure, like "marriage, is a good thing"—and, as my old friend "Abstinence" says, it is good both in "the positive, comparative, and superlative degree;" and I would not give a bawbee for that system which teaches otherwise.

One of the best manures, in reach of every man, I neglected to enumerate—that is, *attention;* attention to small things—it not only acts very quick, but it is of a permanent character, when properly applied. It is sometimes mild, sometimes very pungent, and much too often is applied with a slight, stingy, sparing hand. The great *desideratum* in the use of this article as a stimulant, is its time of application, which should never be deferred one moment when the ground is in order to work. Even in rainy days it may be used to much advantage. But let me here advise the reader of one thing—and that is, its *peculiar liability* to evaporation: and the only way known to the writer for guarding against this evil, is to keep it in active service; such at least, are the views of

SIMON PURE.

From the Southern Agriculturist.

HOOKS IN HORSES.

Sir—Although the best writers on the veterinary art do not recognize such a disease in the horse; your subscriber from Appling, in Georgia, and Commodore Porter from Constantinople,* each relates the almost instantaneous relief afforded to their sick horses, by the very common operation of cutting off part of the third eyelid; the one calling it, according to the Asiatic nomenclature, *bone eye*, the other to the vernacular, *hooks*.

These gentlemen, like many other persons, were deceived, and made to mistake the effect of cold, or of some other inflammatory state of the patient for a disease of itself—nothing is more common. I myself recollect five cases of tetanus which occurred in the summer of 1820, not one of which but would have been called a case of hooks by the advocates of that doctrine. The first was that of a gelding in my own yard, attended by the veterinary surgeon, Dr. Carver. A negro who was in the habit of cutting off the hooks, was anxious to perform the operation. I did not consent: the horse died of violent spasms.

The second was that of a stallion, belonging to Dr. Joseph Glover. Dr. Carver attended it and performed the operation for the hooks—the patient was cured.

The third was that of a gelding, the property of Col. Bryan. Dr. Carver attended this last case, and performed the operation; the patient died.

The fourth was that of a small mare, opposite to my residence; the operation for the hooks was performed in a very early stage of the dicorder: this case terminated fatally.

The fifth was that of a stallion of value, the property of the late Major Manigault, whose tetanus was produced by the puncture of a nail in the foot; it was treated by an eminent surgeon, who exhibited opium in large doses, and saved the life of the horse. I saw the case, and assert that no hooks doctor would have left this horses' eyes untouched. Thus out of three cases in which the operation was performed—one was saved—and out of the two where no operation, one was also saved.

For better information on this subject, I quote from the *Preliminary Treatise to the Library of Useful Knowledge*, published in London, under the superintendence of Lord Brougham and others, the most scientific persons in Great Britain. The Treatise is on the objects, advantages, and pleasures of science, and attributed to the pen of Lord Brougham.

After having described the eye of the bird, the author says, at (p. 30.) "A third eyelid of the "same kind is found in the horse, and called the "*haw;* it is moistened with a pulpy substance "(or mucilage) to take hold of the dust on the "eyeball, and wipe it clean off, so that the eye "is hardly ever seen with any thing upon it, "though greatly exposed from its size and posture. The swift motion of the haw is given to "it by a grisly elastic substance placed between "the eyeball and the socket, and striking obliquely, so as to drive out the haw with great velocity over the eye, and let it come back as quickly. "Ignorant persons when this haw is inflamed "from cold and swells, so as to appear, which it "never does in a healthy state, often mistake it "for an imperfection, and cut it off; so nearly "does ignorance produce the same mischief as "cruelty! They might as well cut off the pupil "of the eye, taking it for a black spot."

I should be glad if any thing I could say through the medium of your useful work, could prevent in any instance those two very commou, very cruel, and unnecessary operations on the horse—I mean cutting for the *hooks* and burning out the *lampus*.

JAMES FERGUSON.

Charleston, November, 1835.

* See American Turf Register for September, 1835, and your work for October, 1835.

From the Journal of the Franklin Institute.

ON THE DIMINISHED PRODUCT AND PROBABLE EXHAUSTION OF THE GOLD MINES OF THE UNITED STATES.

Extract from a review of G. W. FEATHERSTONHAUGH'S Geological Report.

Mr. Featherstonhaugh states that "gold mining is yet in its infancy in the United States; in truth preparations for systematic mining are only now making."—(note to p. 9 of the report.) Persons most conversant with the subject are, however, I believe, unanimous in the opinion, that it has at least reached its full maturity, if, indeed, it be not already past its prime. The only description of gold mines as yet worked with any profit in this country, are those termed deposite mines; and if we look at the present condition of the gold districts in North Carolina and Georgia, where this description of mine has been most extensively found, we shall see that this opinion is not without foundation. In all the counties of North Carolina, south of the mountains, the mines have been worked, and nearly exhausted; in Burk and Rutherford counties, particularly in the latter, where the discovery of mines is of most recent date, there still remain deposites, which if worked with no greater force than that at present employed upon them, may last four or five years longer; and the portion of the Cherokee territory situated in the state of North Carolina, where it has been ascertained that the gold may be found, and in which the mines have been but partially worked, is of very limited extent, and its mines are not considered, by persons who have examined them, to be so rich as those in that part of the territory lying in Georgia. The deposite mines of North Carolina will, therefore, be of finite duration, and the quantity of their produce may be expected to sink gradually under the decline which they have manifested for the last two years.

The deposite mines in Georgia have, probably, been richer than those in any other part of what is called "the gold country;" but the minute division of property in that portion of the state where they were most abundant, occasioned by the injurious system of lottery, under which it was parcelled out amongst the good citizens of the state, and the high degree of excitement into which the public mind had been brought on the subject, occasioned extensive operations to be commenced simultaneously in all parts of the district, as soon as the right of property had been determined.

The extent of each gold lot was small, and the proprietors were eager to reap the golden harvest, by the prospect of which their expectations had been so strongly excited; the consequence of this was, that many of the mines, and some of them the best in the district, were worked out during the first year after the drawing of the lottery; but, so great was the number of adventurers who entered into this business, entirely ignorant of the first principles of mining, that it may be confidently affirmed that more money was lost than made, during that year, in the gold mines of Georgia.

This bad success greatly diminished the number of miners in the succeeding year, but, as those who persevered had acquired more judgement, and conducted their operations with greater skill, their labors were rewarded with better success, and the quantity of gold procured from the mines, during each of the two last years, has been as great as in the first year, and the profits of those engaged in the business more considerable. But this cannot last, and I have been recently informed by an intelligent gentleman, in whose opinion I have full confidence, that nearly all the deposite mines will certainly be exhausted in less than two years more. Some few persons, indeed, who, by their speculations during the drawing of the lottery, obtained possession of several lots, may have reserved localities on which operations may be continued for a longer period, and some of the mines in what are called the older counties, such as that of Mr. Richardson, in Habersham, being of larger extent, may have a proportionably longer duration; the beds of the Chestatee and Etowah rivers may likewise yield gold for a long time, but the annual supply from all these sources cannot be expected to be nearly so great as that which has been afforded during each of the last three years by the mines of this state. I have but little personal knowledge of the mines of Virginia, but by what I have learnt from the accounts of others, the deposite mines of that state have never been either numerous, or very productive. As, therefore, deposite mines are, from the very nature of their formation, and from the ease with which they may be worked, of short duration, in a country where the mining districts are of limited extent, and where the industry of a large population will always be directed to so alluring a pursuit, the hopes of this country for a continued supply of gold from its own resources, must ultimately rest on the vein mines, and it must be to these that Mr. F. alludes, when he says, "preparations for systematic mining are only now making." Now, I am sorry to differ with him in opinion, but I have seen many mines, of various metals, and in different parts of the world, and I never saw one in which more skill and science were evinced in the construction of the works for the reduction of the ore, or in the underground works of the mine, than in the gold vein mine near Charlotte, in Mecklenburg county, N. C., owned by a company in New York, and conducted for nearly three years by the Chevalier Rivafinoli, who was himself a scientific miner, and had under him officers, both natives and foreigners, of competent ability; yet the undertaking entirely failed, not from any want of system, or skill, but because the mine gave out, or became too poor to pay the cost of working. I could mention many other mines, both in North Carolina and Georgia, which at first gave great promise of success, and in which the works, though perhaps inferior to those at Charlotte, were constructed on principles recommended by European practice, but which have all failed from a similar cause. In consequence of these disappointments, vein mining for gold has been very generally abandoned, and I believe no other than the Capp's mine, near Charlotte, was in course of work at the close of 1834. As, during the last year, I have been less acquainted with the actual state of the mines than formerly, I do not know what may be the present prospects of the last mentioned mine, or whether any others have been opened in North Carolina, or Georgia; but the instances I have cited, sufficiently prove that the present low condition of vein mining in those states is rather owing to the poverty of the mines, and to their small extent in depth, than to the want of system, or industry, in their management. Mr. Featherstonhaugh says, "not one shaft has yet been sunk exceeding 160 feet;" a satisfactory reason to account for this is, that every mine, yet opened, has given out before it reached that depth. Several gold vein mines have likewise been discovered in Virginia, and the working of one in Fauquier county has been commenced by a company, which is proceeding with much spirit in the undertaking; it is to be hoped success will crown the efforts of its proprietors, but no reasonable conjecture can be formed as to their prospects, till they have reached the depth of from 100 to 150 feet.

These observations certainly militate against the conclusion, "that the progressive scale of production since 1824 warrants the most favorable anticipations for the future;" for, if they are correct, it may rather be expected that the produce of gold from the mines of this country has already reached its maximum, and is henceforward likely to decrease. According to a statement, which I saw a few days since, of the quantity received in the mint during the present year, 1835, it appears to be less than that received in 1834, by between twenty and thirty thousand pennyweights, and not to amount to more than one-fourth part of the three millions of dollars, predicted by Mr. F. as the produce of the year; and it must likewise be considered, that, in consequence of the advanced price given at the mint, under the new regulation of the value of gold, the proportion of the whole produce which now reaches that establishment, is likely to be greater than formerly.

In page 14 of the report, we find the following remark: "talcose slate is a mineral formation, in which the auriferous veins of the United States are found, the veins in some parts of the country, passing through a field of talcose slate several miles in breadth, whilst in others they are sheathed only, as it were in the talcose slate, and pass through a field of elvan and granite rocks of various kinds." If by this assertion, it is intended to be implied that talcose slate is exclusively the repository of the gold veins in the United States, it is certainly at variance with general experience; that this formation is favorable to the production of gold, and that veins of that metal are frequently found in it, will readily be admitted, the mines of Virginia and some of those in Georgia are thus situated, but nearly all those of North Carolina and most of those in Georgia are found in a very different rock: and no instance, I believe, of a gold vein in granite has ever presenteded itself in this or any other country; the small quantity of gold found in Cornwall has always been obtained from the formation, known in that country by the name of killas.

Our author appears to be a believer in the exploded doctrine, that the formation of metallic veins is attributable to the ejection of mineral matter in a state of igneous fusion from the interior of the earth; should the capitalists of Missouri be induced, by a confidence in "the reasonableness of the opinion that metallic veins have their origin from below," (p. 10) to enter with more spirit into the business of mining, it would undoubtedly be a benefit both to themselves and to their country; but should this be their only inducement, it may be feared, that they will be discouraged in the pursuit, when they discover that the most eminent geologists in this and other countries consider that such a mode of their formation is far from being satisfactorily established; if such however is the opinion of Mr. F. he certainly has a right to express it, but as it has been a controverted question, some reasons for such a belief, more conclusive than his arbitrary dictum, would perhaps have been desirable in a work intended to be "permanently instructive."

Mr. F. does indeed refer to some circumstances in a subsequent part of his work, which, he says, "seem to point to a projection of mineral and metallic matter from below:" but, if we examine these circumstances we shall not, I think, find in them, any thing like an argument to support this hypothesis. That the flat or horizontal veins which he met with in the lead mines of Missouri, are "lateral jets from the main lode," cannot be doubted; but the position of the metal at the bottom of the cavities or pockets which he describes, is most satisfactorily accounted for by the supposition that it has percolated, whilst in a state of fusion, through the soft matter of the red clay; for the admission, that it was brought into this situation by a projection from below, would be a contradiction of his own theory of their formation.

From the Journal of the Franklin Institute.

REPORT IN RELATION TO A PROPOSED RAIL ROAD FROM THE RIVER OHIO TO THE TIDE WATERS OF THE CAROLINAS.

The committee to whom was referred the subject of a rail road from the valley of the Ohio river to the maritime coast of the Carolinas and Georgia, having in a general manner considered its practicability and advantages, beg leave to submit the following report.

The states which border on the Ohio, or are watered by its great tributary streams, are western or tramontane Pennsylvania and Virginia, Ohio, Indiana, Illinois, Kentucky, and Tennessee; nearly through the centre of which that river flows, almost parallel with the sea coast of the old southern states. From the seven states above mentioned, there are highways of communication with the ocean in but two directions—north-east, and south-west. The former, consisting of several distinct lines of river, canal, macadamized and rail road communication, reaches the Atlantic ocean between the west end of Long Island Sound and the mouth of Chesapeake Bay—from New York to Norfolk—a distance, on a straight line, of 300 miles. The latter communicates with the Gulf of Mexico by the delta of the Mississippi. Between these two points of marine connection with the interior, is a coast nearly 3000 miles in extent, constituting the sea-board of southern Virginia, North and South Carolina, Georgia, Florida, Alabama, and Mississippi, with which the states in the valley of the Ohio have no direct communication, even by means of a good post-road, so that the mail to the northern frontier of Georgia and the Carolinas, not three hundred miles distant from the banks of the Ohio, in a straight line, is actually sent by Washington City, on a route nearly four times as long. With that part of the southern coast which lies west of the peninsula of Florida, the Ohio states have ready intercourse, by the Mississippi river; but with the region east of that peninsula, they are destitute of all adequate means of commercial and social connection. Here then is a great desideratum, which can be supplied in no other manner than by the contemplated rail road.

Starting, perhaps from more than one point on the Ohio river, in the state of Kentucky, this road should stretch nearly south; and branching, when it enters the Carolinas and Georgia, to reach their tide-waters at several different places. Taking Cincinnati as a city intermediate between Maysville and Louisville, and Charleston as intermediate between Wilmington, in North Carolina, and Augusta, in Georgia, the road might be said, more especially, to connect Cincinnati and Charleston, and may for convenience in this report, take its length and designation from those cities. Starting from the former, or rather, from the opposite bank of the Ohio river, in Newport or Covington, it would traverse the state of Kentucky to the Cumberland Gap, near the south-western angle of the state of Virginia, then cross the state of Tennessee, and, ascending the valley of the French Broad, in North Carolina, arrive at Greenville, or some other point, in south Carolina, beyond the Alleghany Mountains, whence it may pass down to Augusta, in Georgia, by one branch, and by another more immediately to Charleston, in the direction of Columbia. In traversing North Carolina, it might with facility, the surface of the country permitting, be connected by a lateral road, with the projected Cape Fear and Yadkin railway, which passing through Fayetteville, is to terminate at Beaty's Ford, on the Catawba river.

The distance between Cincinnati and Charleston, on a straight line, is about 500, which would probably require a road of 700 miles. South Carolina, however, has already made a rail-way, 135 miles in length, to Hamburgh, on the Savannah river, opposite Augusta, nearly in the direction of Cincinnati; and the contemplated rail road to Paris, in Bourbon county, Kentucky, exactly in the course of Charleston, (for the construction of which there are, in the opinion of your committee, a great many weighty reasons of a local nature,) would have a length of about 90 miles, thus leaving but 475 miles to complete this new and most important communication, between the interior and the sea-board of the south.

The middle of this main trunk would be intersected by the projected rail road from Richmond, Virginia, *via* Lynchburg, to Knoxville, in east Tennessee, by which the Old Dominion would acquire a new channel of intercourse with her daughter Kentucky; and also with several of the states formed out of the north-western territory, which was once her property—travelling from the west to southern Virginia, being thus restored to the route which it took in the infancy of our settlements.

By an extension west, to Nashville, of the Richmond, Lynchburg and Knoxville road, the whole of central and north Tennessee would be enabled, with great facility, to communicate with the Carolinas and Georgia, by means of the southern extremity, and with the state of Ohio, by means of the northern extremity of the great highway under consideration.

From the maritime terminations, and the lateral branches of this extended trunk, let us turn our attention to the northern or continental connections which it would establish.

These would extend, both east and west, from Cincinnati, for several hundred miles, and through every intervening northern point. First, the Ohio river would connect it with western Virginia and western Pennsylvania—embracing the valleys of the great Kanawha, Monongahela and Alleghany rivers: Second, the Ohio and Erie canal, from Portsmouth to Cleveland, already finished; the Miami and Maumee canal, in progress from Cincinnati to Lake Erie, uniting at Fort Wayne with the Erie and Wabash canal of Indiana; and the Mad-river and Sandusky rail road, from Dayton to the Lake, the execution of which has commenced, would connect it with the entire chain of northern lakes, from the falls of Niagara to the Straits of Mackinac, and even Green Bay, on the western shore of Michigan, including the eastern border of Wisconsin Territory, north or maritime Illinois and Indiana, the whole of Michigan Territory, a part of Upper Canada, and the centre and northern declivity of Ohio: Third, the Wabash and Erie canal just mentioned, and the rail road from Lawrenceburg, at the mouth of the Great Miami, to Indianapolis, already begun, would carry its advantages into the depths of Indiana: Fourth, the Ohio river from Cincinnati to the Mississippi would connect it, beneficially, with south and west Illinois, Missouri, and the immense extent of unsettled territory watered by the upper Mississippi and Missouri rivers. Thus the proposed main trunk, from Cincinnati to Charleston, would resemble an immense horizontal tree extending its roots through, or into, ten states, and a vast expanse of uninhabited territory, in the northern interior of the Union, while its branches would wind through half as many populous states on the southern seaboard.

The extent of this inland communication from north to south, through the centre of the United States, would comprehend at least 15° of latitude, and could only be compared with that established by the Mississippi river. It would not indeed be limited by the continent, for, as many important islands of the West Indies are contiguous to South Carolina, they would, in fact, be comprehended in the new facilities of intercourse that would be established between the south and north, and should, therefore, be taken into the estimate.

Of the physical practicability of constructing the main trunk of the proposed rail-way, across the states of Kentucky, Tennessee, and North Carolina, your committee see no reason to entertain a doubt. It is true, that it must traverse many of the branches of the Cumberland and Tennessee rivers, and scale the southern extremities of the Alleghany Mountains. One of the branches, however, of the latter river, the French Broad, as we have already seen, originating on the slopes of the Blue Ridge, the most southern of the mountain chains, runs to the north, traversing the western angle of North Carolina, to unite with the Tennessee, thus opening a pass through a part of the mountains, and inviting to the enterprize. Of the height of the remaining mountains, your committee cannot speak with confidence, but believe it to be less than that of the Alleghanies, where they are traversed by the rail road and canals from Philadelphia to Pittsburg. However this may be, no decision of the question of physical practicability can be made, but by competent engineers, on an actual examination of the route.

The question of expense can of course only be settled by the same means. Assuming that the projected rail road from the Ohio river, opposite Cincinnati, to Paris, in Bourbon county Kentucky, will, from the considerations limited to the region of country concerned, be most certainly executed, and referring to the actual completion of the rail road from Charleston to Augusta, the intervening section would not, as we have seen, exceed 475 miles, which, at the high price of 12,500 dollars per mile, would amount to 6,000,000 of dollars; a sum not greater than is about to be expended by a company of capitalists, in the construction of a rail way within the state of New York, to run nearly parallel with her grand canal, and connect the same waters with the same city.

It may be said, however, that the central part of the Cincinnati and Charleston road would run through a country but thinly inhabited, and furnishing little aid, either in the construction of the road or in swelling the amount of transportation upon it. But why is it so sparsely peopled. Manifestly, in part, because of all portions of our common country, it is the most inaccessable and the most destitute of facilities for the exportation of its iron, salt, coal, tar, turpentine, and other natural productions. To wait, therefore, for a denser population, as a condition for commencing a great work of internal improvement, which only can augment that density, would be to wait for the developement of an effect, before resorting to the only cause that can produce it. Let the road be executed, and an instantaneous impulse will be given to improvement in that region. If, however, it were too steril for such a result to occur, no argument against the project could arise from that fact, for the undertaking is necessary to the reciprocal exchange of the productions of the states penetrated by its extremities, in which respect it would be similar to the Philadelphia and Pittsburg route, which, in a part of its course, passes over uninhabited mountains, and still facilitates an immense trade between the east and west.

Thus it is not necessary that the whole line of an artificial way should lie through a cultivated and populous country, nor need we look to the inhabitants along this or any other projected rail road or canal, for the means of its construction. These will be furnished by the capitalists of any and every part of the country, or even by those of Europe, the moment the enterprize is authorized by the states through which it is to be carried on, and the probabilities of a profitable investment are rendered manifest. In the opinion of your committee, the states of Kentucky, Tennessee, and the Carolinas, might, in their sovereign capacity, execute this work, and make it a rich and lasting source of revenue; and, they have as little doubt, that the incorporated joint stock companies would at once be able to command the requisite capital.

Your committee are of opinion, that the strongest motives exist for the immediate execution of this great work. At least half the people of the union, comprehending, in whole or in part, in East Florida, Georgia, South Carolina, North Carolina, Virginia, Pennsylvania, Tennessee, Ohio, Michigan, Indiana, Illinois and Missouri, are interested in its completion, as they would instantly participate in its advantages; and, as your committee believe, need only to investigate the subject, to be at once aroused to efficient action.

Would it pass, like the New York canal, or the projected rail road from Augusta, in Georgia, to Memphis, in Tennessee, nearly from east to west, and consequently combine regions which have similar climates, and identical productions, its value would be far less. But, as we have seen, stretching boldly from north to south, and, with the present and future public works of the states between the Ohio river and the lakes, establishing a high road of communication through nearly all the climates and varieties of soil, productions, and people of the United States, it would forever stand alone and conspicuous among the public works of the union, both in the kind and amount of commercial and social intercourse which it would promote.

The sustenance and manufactures of the corn states, from Kentucky to Michigan, would instantly pass along it to the southern consumer, of the region from Cape Florida to the Chesapeake Bay, avoiding all the delays, commissions, dangers of the river, and dangers and damages of a tropical sea voyage which belong to the Mississippi and Gulf route; and even much of the produce that might be designed for coasting or foreign exportation, would reach the sea-ports of South Carolina and Georgia, by the same channel, instead of going to New Orleans or New York. On the other hand, the tropical productions of the north east of Cuba, and of East Florida—their spices, sugar, oranges, lemons, and figs;—and the indigo, rice and cotton of Georgia and Carolina would, by the same direct route, penetrate, in a few days, the interior of the continent, and spread among the consumers, even to the shores of Lake Superior.

Some of your committee, indeed, incline to the belief, that the same channel would, at no distant time, become an inlet for many of the productions and manufactures of foreign countries; for commerce, as far as possible, should be based upon a direct exchange of productions and commodities. Thus the shipping merchants of Charleston and Savannah, might barter their cotton in Europe for manufactures required by the people of the states in the Valley of the Ohio, and exchange the same for their sustenance; the whole operation, both continental and marine, being performed without the instrumentality of any other money than that employed in defraying the expenses of transportation.

Of the amount of the business that would, at length, be conducted on this national high-way, the committee scarcely dare to speak. To them it appears of a magnitude, which they fear the meeting and the community at the present time would regard as extravagant and incredible. By the existing population of the portions of country, even now connected with the work, there would be a great amount of travelling and transportation; but the extent to which it would augment the population of the zone of country through which it would pass; the impulse to agriculture it would impart; the manufacturing establishments it would set up, and the lateral turnpikes, rail roads and canals it would suggest, to new districts of country, from the western slopes of the Alleghany Mountains to the banks of the Mississippi, from the sea to the lakes, would make it the parent of a great system of central internal improvement, and enable it to augment the amount of its articles of transportation to an indefinite degree. These immense pecuniary benefits, accruing to millions of people, should, of themselves, prompt those who are interested to an immediate attention to the work; but there are other and nobler considerations, which should not be overlooked.

No public work could contribute more powerfully to our national defence. Establishing a direct and rapid communication, between the northern and southern frontiers of the United States, separated, unlike the eastern and western, from the dominions of foreign nations by narrow sheets of water only, it would afford facilities for the transportation of troops, munitions of war, and military sustenance, from the centre to the borders, or even from one frontier to the other, with unexampled rapidity; thus favoring a concentration, requisite to national defence in the time of war, which could not otherwise be effected; and which would present a new triumph of civilization over barbarism, by making civil public works, an efficient substitute for standing armies and powerful navies, which exhaust the resources and endanger the liberties of a nation.

But the most interesting and affecting consequence that would flow from the execution of this enterprize, would be the social and political.

What is now the amount of personal intercourse between the millions of American fellow citizens of North Carolina, South Carolina, and Georgia, on the one hand, and Kentucky, Ohio, Indiana, and Illinois, on the other? Do they not live and die in ignorance of each other; and, perhaps, with wrong opinions and prejudices, which the intercourse of a few years would annihilate forever? Should this work be executed, the personal communication between the north and south would instantly become unprecedented in the United States. Louisville and Augusta would be brought into social intercourse; Cincinnati and Charleston be neighbors; and parties of pleasure start from the banks of the Savannah for those of the Ohio river. The people of the two great valleys would, in the summer, meet in the intervening mountain region of North Carolina and Tennessee, one of the most delightful climates in the United States; exchange their opinions, compare their sentiments, and blend their feelings—the north and the south would, in fact, shake hands with each other, yield up their social and political hostility, pledge themselves to common national interests and part as friends and brethren.

Finally, the immense summer throng of visitors which annually go up to the north, along the sea board, would be made still greater, and turning westwardly through the states of Virginia, Maryland, Pennsylvania and New York, spread over the northern centre of the United States, to the shores of the lakes and upper Mississippi; concentrating on their return in the valley of the Ohio; having seen what they now never see and made acquaintance with what at present is unknown to them, the very heart of the Republic. On the other hand, the people of the north would, in autumn and winter, pour down upon the temperate plains of the south, in turn, studying their political, civil, and literary institutions, participating in their warm hospitality, catching a glow of southern feeling, gratifying their curiosity, and return enlarged in their patriotism and enriched in their knowledge of our common country. Thus this travelling, alone, would, at no distant day, reimburse the expenditures by which it be created, might while it would unite with the ties of business, in confining with a new girdle, states which are now but loosely connected, and thereby contribute powerfully to the perpetuity and happinesss of the union.

DANL. DRAKE,
T. W. BAKEWELL, } Committee.
JNO. S. WILLIAMS,

Cincinati, Aug. 15, 1835.

NEW EXPERIMENTS ON THE MEANS OF PRESERVING WHEAT FROM THE SMUT.

BY M. MATHIEU DE BOMBASLE.

Translated for the Farmers' Register, from the *Annales de l'Agriculture Francai e.*

I commenced in the fall of 1831, a series of experiments having for their object to investigate the best means of preserving wheat from the smut, which often causes to agriculturists very considerable losses in their harvests, and besides injures the product so as greatly to diminish its value. I have continued these researches during four years, subjecting to my experiments the means, till now regarded as most efficacious, together with a great number of others. Each year, I devoted myself to new trials with the design to settle some doubts which the results of my former experiments left in my mind. I have at length come to a conclusion which I may consider as perfectly satisfactory, and I may announce that hereafter it will be easy for all cultivators to obtain with certainty, by the aid of very simple means, crops of wheat entirely free from smut. I have already published some details relative to my experiments of the two first years; and I shall now give an account of those, the results of which have been established by the harvests of 1834 and 1835. I shall precede this statement by a summary of the experiments of the two former years.

The most remarkable results of my first years' experiments observed in the crop of 1832, were these: lime and common salt employed separately offer very inefficient preservatives; but by combining these two substances in certain proportions, we obtain an action much more powerful for the destruction of the germs of smut; and this action is greatly superior to that of sulphate of copper, or blue vitriol, whether employed alone, or in combination with common salt, as is often practised. The sulphate of copper had been considered till then, according to the experiments of M. Benedic Prévôt, as the most powerful agent that could be opposed to this disease of wheat; and it was already an important gain to have discovered a more efficacious action in substances that may be placed without danger, in the hands of the agricultural population; for when we are aware of the heedlessness which attends all their operations, we cannot but be alarmed at seeing farm servants handle in considerable quantities, a substance so poisonous as sulphate of copper.

Besides lime, the sulphate of copper and common salt, I subjected to my experiments in this year, potash, the sulphate of iron, and sulphureous acid; employing these various substances either separate, or combined with each other in different manners, and in different quantities. Many of these preparations were completely inefficacious; some of them were more or less injurious to the germinating faculty of the wheat itself—and for those which showed some power as preservatives from smut, it had been necessary to employ the process of steeping, to obtain a somewhat efficient action of the preservative agents; that is, it had been necessary to immerse the grain in the solutions of the different substances, and to let it remain there in maceration a longer or shorter time. It has been long known that this plan gives great effect to the preservative agents, and Arthur Young considered it necessary, from the result of his experiments, to let the grain remain for twenty-four hours in water, impregnated with lime. Mr. Bosc, in the article *Carie*, in the new '*Cours complet d'agriculture*,' presents the same indication from the result of the experiments of M. Tessier. I will observe here, that in the same article, this author, proceeding by theoretical analogy, attributes to potash a preservative faculty as powerful as to lime, while, according to my experiments, carbonated potash, as it is found in commerce, exerts no action whatever on the smut. In the same manner M. Bosc, relying upon the theory, prescribes, as superfluous, the mixture of common salt, or of any other salt with the lime; whereas the facts prove that this mixture exerts an action incomparably more powerful than either of the substances taken separately. So true it is, that, in every thing that relates to organized bodies, the facts themselvs must be consulted, and not scientific theories or analogies.

The following year, in a series of twenty-seven experiments I continued to subject to proof in various combinations, lime and common salt, and I added to these carbonate of soda, combined in different proportions with the lime as well as the *chlorure* of lime employed alone in solution, and in divers proportions, and the hydrochlorate [muriate] of lime. The results confirmed perfectly those of the preceding year; as to the efficacy of the mixtures of lime and common salt employed for *steeping*, they showed again, that lime employed alone by sprinkling has little effect, and that the hydrochlorate of soda [common salt] and the hydrochlorate of lime have scarcely any, nor has the *chlorure* of lime. Besides I did not succeed in obtaining from any of the agents employed a sufficiently powerful action without using the steeping process; and as I was much interested to discover a preservative means, by the more simple and easy process of sprinkling I determined to pursue my course of experiments the following year. In fact, those persons who have recommended the use of steeping for liming wheat, do not know how much trouble and difficulty this process occasions in country farming. This trouble is so great, that there is not, I believe, one farm in a thousand, on which the grain is limed by steeping; and every where the practice is confined to sprinkling, although it is well known that steeping is much more efficacious. I considered it then very important to find out a process by sprinkling, which should be at least equally efficient with the use of steeping, as practised by a very small number of farmers.

My experiments of the succeeding year, were therefore directed to investigate the efficacy which might be expected from agents applied by sprinkling. I subjected to these experiments, lime, the carbonate, the hydrochlorate, and the sulphate of soda, using the lime alone, in various proportions, with various modes of application, as well as combining with it each of the three salts in different proportions. The number of smutty heads in the sowing made of wheat artificially infected with smut, was five hundred and seventy, in a thousand. By sprinklings with white-wash of lime in different proportions, some of which were in enormous quantities, I succeeded with difficulty in obtaining a diminution of one-half in the proportion of smutty heads. In the beds sown with wheat treated with mixtures of lime, and the three salts which I have just mentioned, the proportion of smutty heads was still very great, and generally from two to three hundred in a thousand: from these I must except, however, a single one of the beds—the result of which, struck me forcibly; it had been treated with lime and sulphate of soda,* and it was ascertained that it did not contain a single smutty head. It was the first time since I had devoted myself to experiments of this sort, that I had obtained in the result, the complete destruction of the germs of smut in wheat infected to a very great degree, as was that which I used; for after treating the wheat in the preceding years even with sulphate of copper, or lime, aided by the process of a long steeping, there had still been from eight to twenty smutty heads in the thousand; and after treating it in like manner by steeping, with a mixture of hydrochlorate of soda, [common salt] and lime, the most efficient combination which I had till then met with; there were still found two smutty heads in the thousand. But here there was not one smutty head in more than twenty thousand that the square contained! Yet on the side of this one, and in the neighboring squares, I had beds treated with the same substances in proportions almost exactly equal to those of this exempt square, and they had given from two to three hundred smutty heads in the thousand. As I am in the habit of keeping exact notes of the most minute details of experiments of this kind, I examined these notes with care, and discovered that the square free from smut had indeed been treated with the same substances as the others, but with a mode of management a little different. In all the operations made with lime, and one of the three salts above mentioned, the infected wheat had been first sprinkled with a certain quantity of slaked lime, and mixed with care; afterwards the solution with which the experiment was to be made, was poured upon the wheat, and it was mixed again. By adopting this order, I could make the mass absorb a greater quantity of the solution—but in a single one of these operations, and for some unimportant reason, an opposite order had been observed; that is, the wheat had been first wetted with the solution; and when the mixture had been well made, the grain still wet, had been sprinkled with the same quantity of lime as the other. I had never at that time had any idea that this difference could produce any effect on the results; but this square, as has been seen, was the only one quite free from smut. On consideration, I concluded that when lime, or a mixture of lime with a solution, was first used, it might be conceived that the lime incrusts the surface of the grain so as to weaken the action of the other agents; while if the surface of the grain and the dust of the smut are first wetted with the solution, they are much better impregnated with it; and that the lime, coming after, modifies in some way the solution with which these bodies are impregnated. Nevertheless, however striking was the fact observed, this explanation was but a conjecture, which it was necessary to test by new proofs. Consequently, I made no publication of my experiments of that year, and repeated the course of them by new sowings in the autumn following.

In these experiments the same steps were followed as in those of the years preceding: a double *décalitre** of seed wheat was first artificially infected with smut: afterwards a piece of ground was divided, as equally as possible, into squares of 25 *metres* length;† separated from each other by paths one metre wide; and in each of these squares was sown, with the most minute care, one-half *litre*‡ of infected wheat, either in its natural state, or subjected to the various preparations intended to destroy the infection. This year, however, in order to make a nearer approach to the ordinary

* The sulphate of soda, is what is commonly known as Glauber's salts. Ed.

* The décalitre is equal to 2.2009667 gallons English, (or American,) or rather more than 2 and one-fifth. Ed.

† The metre is equal to 3.2808992 English, or nearly 3 and three-tenths.

‡ The litre is 1.760773 English pints, or a little more than 1¾.

circumstances of practical agriculture, I did not infect the wheat to as great a degree as had been done in the preceding years, in which the grains had been completely blackened by the dust of the smut. On this occasion, the dust was added only in a sufficient quantity to alter the color of the grains perceptibly to the eye, without making them black; only the extremities of the grains covered with down, were completely blackened; and in fine, this wheat was affected and injured by the smut to a degree greatly beyond what is ever met with in the markets, and was such as would never find a purchaser. This wheat thus infected, and sowed without any other preparation, gave, when gathered, a hundred and forty-three smutty heads in the thousand, whereas in the preceding years, the infection carried to a much higher degree had given from five to seven hundred. All the preparations of this year were made by means of sprinkling, but the liquid was applied first, and the lime afterwards as has been just explained.

Lime alone employed in this way, after wetting the grains with pure water, or white-wash; and in the quantity of from one to two kilogrammes* to the hectolitre,† presented the proportion of two, seven and twenty-four smutty heads in the thousand.

Lime, in the quantity of two kilogrammes to the hectolitre, first made into white-wash, with a solution of a demi-kilogramme of common salt, or hydrochlorate of soda, gave still two smutty heads in the thousand.

Lime, in the quantity of two kilogrammes, and common salt in a proportion which varied from five hectogrammes to two kilogrammes, the whole to the hectolitre of grain, but applied separately, first wetting the grain with the solution of salt, offered not a single smutty head in one case, and produced from one to three in the others.

Lime, in the same quantity as above, united with sulphate of soda also in the same proportions, and with the same mode of management showed not a single smutty head in the three squares which were subjected to this preparation.

This result as is seen, fully confirms that of the preceding year, and we have henceforward, in the use of sulphate of soda united with lime, a preservative means against smut, not only superior in efficacy to all those which have been known till now, but even of an efficacy which may be called absolute; since it did not leave a single smutty head in the four squares—in which it was used during the two years, and which contained together more than eighty thousand heads of wheat; and since, it has even completely destroyed the germs of smut in a sowing, infected to the extreme degree of that of the year 1833. This means so powerful consists in the use of substances of very low price, presenting no risk to men or animals, and with a mode of application the most easy, and least troublesome.

I will give presently, the details of the process of liming as it ought to be performed according to my experiments, reducing the quantities to the hectolitre, as I have done in the preceding notices: but some very important considerations ought to be first presented. From the commencement of my experiments I had ascertained that certain preparations, at the same time that they exert their action on the germs of the smut, tend also to injure, in different degrees, or even to destroy entirely, the germinating faculty of the wheat. This is a point to which certainly not enough attention has been paid up to this time, and of which no mention is made, I believe, in any of the writings published on this subject. It has probably very frequently happened that crops of wheat have been thin and unproductive, without a suspicion of the cause, which was to be found in a liming made in an improper manner. In the course of my experiments I have particularly remarked this injury to the germinating faculty of wheat in sowings treated with sulphurous acid, with carbonate of soda united with lime, or even employed alone either for steeping, or sprinkling. The same observation was made in sowings sprinkled with common salt and lime; when I endeavored to increase the efficacy of these agents by repeatedly wetting the grain thus treated with water during twenty-four hours. These observations induced me, in my experiments, to pay particular attention to this property of the agents employed as preservatives from smut, and each year the effects produced in this repect by each of the preparations made use of, have been ascertained with care, by means which it would be too tedious to specify in this place.

In a publication made last year, a distinguished agriculturist of the neighborhood of Paris, announced that he had entirely lost his sowings of wheat on large fields, from having, in liming it, diluted the lime with cows' urine, instead of the drainings of the dung-hill which he generally uses for this purpose. Many other similar facts have remained unobserved, or been known but to few persons, from the general reluctance of farmers to publish the results of their operations. In relation to the particular fact of which I have just spoken, I will say that it is quite common for farmers to mix with the lime and other mineral substances which they use for liming, different very strong manures, such as the liquids above mentioned, the dung of pigeons, or fowls, &c., &c. It is evident that, in the minds of the men who have adopted these means, the addition of such substances was designed to give greater activity to the vegetation of the wheat—at the same time, that the germs of the smut were destroyed by the lime, or other mineral agents; for it is not probable that any one could ever have supposed, that manures could, of themselves, destroy the principle of the smut; but the design which they must have had in this, is founded in ideas entirely erroneous as regards the nutriment of vegetables. In the first days which succeed the developement of the germ, the seed itself furnishes the only nourishment which can support the germ, and this nourishment consists in principles of a particular nature, formed in the seed, to accomplish this object. Art has never yet discovered any substance which can substitute the kind of milk that is produced in the seed, at the period of germination; and if we would subject to experiment all the preparations which have been pointed out to give more activity to vegetation at this period, we should find them all inefficient or injurious. It is the radicle which is first developed,

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* The kilogramme is 2.20548 pounds avoirdupois, or rather more than 2 and one-fifth.

† The hectolitre (100 litres,) is 22.009667 gallons—little more than 22 gallons, or 2 & six-eighths of a bushel.

and it has already acquired a considerable growth when the germs of the stalks rises out of it, to reach the surface of the earth, where it acquires a new developement, which enables it to respire the atmospheric air. Till this moment the life of the plant is altogether interior; it is the life of a *fœtus* in the womb of a mother, or in an egg. The animal fœtus can receive no nourishment from without, until its respiratory organs have been brought into contact with the atmosphere, and it is exactly the same with the vegetable kingdom. It is only at the period when the cotyledons are sufficiently expanded to absorb atmospherical air, that is, when they have acquired the green color of leaves—that the radicle is able to extract from the soil which surrounds it any nutritive substance; but at this time, the radicle is quite long, and has descended from one to two inches below the point, at which the grain was deposited in the soil. How could it be supposed that the minimum quantity of manure with which the seed was impregnated, could then be imbibed by the radicles which are unable to absorb any thing except by their inferior extremities? On the other hand, during all this time of its first growth, the young plant is very delicate, and may easily be destroyed by agents which might have served it for nutriment at a more advanced period of vegetation. Hence it is, that if oil-cake be spread in the same drill with the seeds of wheat, beets, buckwheat, &c. and the whole be covered with earth, scarcely any of the seeds will come up, as I have ascertained by repeated experiments. It was certainly by an action analogous to this, that the cows' urine, in the case just mentioned, produced such disastrous effects. The same agriculturist had formerly used in liming, without inconvenience, the drainings of the dunghill: but as this liquid may vary considerably in its nature, according to the age of the dunghill, and to the species of animal from which it is formed—and according as it is more or less weakened with water, or more or less concentrated, in consequence of rains, droughts, &c., &c. it might be very possible that employed under different circumstances, it would produce very bad effects; and, as mixtures of this sort can be useful in no way, I think it would be better to dispense with them altogether: and to employ only pure water as a solvent or vehicle of the preservative agents.

I shall conclude this article by giving, in detail, a description of the most effectual mode of liming, as established by my experiments. In my various operations, I have used the sulphate of soda in quantities, which have varied in the proportion of 1 to 4. As the germs of smut have been completely destroyed by the weakest as well as the strongest dose, or seeds infected to the highest degree—I shall here give the weakest as being sufficient in every case. I should say however, that in making use even of the greatest proportion, I have ascertained that this mixture has no injurious influence on the germinating faculty of the wheat.

Description of the process.—The sulphate of soda of which I speak in this place, is a salt which is produced in great masses in the manufacture of soda—and which may be procured at all the druggists' at a lower price than common salt; it is not at all poisonous; a solution of it in water will preserve its properties for a long time, and it may be prepared beforehand for the whole duration of the sowing season. As for the lime, it should be taken in lumps and slaked by the addition of the small quantity of water necessary to reduce it to powder, or dissolve it. It ought to be applied newly slaked, and if it is necessary to keep it for some time, it should be preserved from the contact of the air, by placing it in a barrel with the head out, and covered first with a linen cloth, on which should be spread, to the depth of a couple of inches, some substance in a dry powder, such as ashes, well dried sand, &c. Whenever any of the lime in powder is taken out, this covering should be immediately re-placed: if this precaution is not adopted, or is inconvenient, the lime should be slaked as it is needed, and that which has been slaked for two or three days, should be rejected. All these precautions are generally dispensed with, in the various uses of lime, because when it has been slaked, it preserves for a very long time the same exterior appearance; and to judge of it only by the eye, it would be supposed to be always the same substance; but in proportion as the lime absorbs the carbonic acid of the air, which is rapidly done, it loses its alkaline quality, and becomes as inert as powdered chalk.

The sulphate of soda should be first dissolved in pure water, in the proportion of 80 grammes to the litre, or 8 kilogrammes to the hectolitre: as this salt does not dissolve readily, it would be well to perform this operation the night before, shaking the liquid repeatedly till the salt is well dissolved. The grain to be limed should be placed in a heap on a floor of mortar, flag-stones, or level pavement; it should be watered by means of a common watering pot, and at the same time workmen, furnished with shovels, should mix and stir up the grain rapidly. The watering and stirring should be continued till all the grains are well wetted over their whole surface, and until the liquid begins to flow away from the heap, which indicates that the grain can receive no more: this operation absorbs about 8 litres to the hectolitre of grain; but it would be useless to measure the liquid, and it is sufficient to observe the rule just given. As soon as enough of the liquid has been received, and while the grains are still quite wet on their surface, the lime in powder is immediately sprinkled, stirring the mixture briskly all the time, and lime is added till it reaches the proportion of two kilogrammes to the hectolitre of grain. When the mixture is complete and all the grains are equally covered with lime, the operation is finished, and the seed thus prepared may either be sown immediately, or kept for several days. As it has not imbibed as great a quantity of water as it does in the operations performed by steeping, it is not necessary to spread it out in thin layers, and it may be left in the heap without danger of heating: it is however advisable to turn the heap over every three or four days.

The quantity of lime that I have directed does not require a great degree of exactness, so that the trouble of weighing, every time the quantities used, may be dispensed with; it will be sufficient to ascertain, by weighing once, the quantity contained in any vessel convenient for this purpose, for instance, a porringer, or some such thing; and the same vessel may be always employed as the measure of the quantity of lime for each operation. Such a vessel should always be provided before hand, and the lime should be prepared and ready for use; for it is very important that this should be sprinkled upon the grain at the very instant it is wet upon the surface, for if a delay of some minutes should occur in sprinkling the lime, the solution would be previously absorbed by the substance of the grain, and the lime would no longer act in the same manner.

If this method is pursued with the precautions that I have directed, wheat infected with smut, to the highest degree may be confidently sown, with a certainty that it will not produce a single smutty head, at least in consequence of the disease of the seed. Some persons believe that smut may still be introduced into the crop from other causes; for my part, none of the facts which I have been able to observe, either in my agricultural practice, or in the course of my particular experiments on this subject, authorize me to subscribe to this opinion; and I am inclined to think that the facts upon which it may have been established were the result of an imperfection in the mode of liming hitherto employed.

From the Veterinarian.

NEW FACTS IN PROOF OF THE ADVANTAGE OF SPAYING MILCH COWS.

By M. Regere, M. V., Bordeaux.

Several instances have been related in your journal of the good effect resulting from the spaying of milch cows. I would beg leave to add some cases which have come under my own observation. The cows were taken from the best dairies, but, for obvious reasons, I selected those that had met with some accident at the time of calving.

Case I.

A large cow, fifteen years old, had calved on the 24th of January, 1834, and had, a few days after parturition, given from three to four gallons of milk per day. On the 22d of April following, she yielded only two or two and a half gallons. I then operated upon her. The pain of the operation, and the restricted diet to which she was afterwards subjected, diminished the produce to half that quantity.

As soon as the consequent inflammation had disappeared, and the cow returned to her usual food, the flow of milk rapidly increased; and, in fifteen days after the operation, the wound having healed, she yielded daily from two to two and a half gallons, and that quantity has not since diminished. She has also taken on a disposition to fatten, and is in better condition than she ever was before. She has once shown a desire for the bull, but was not sent to him.

Case II.

A small cow, six years old, calved on the 26th March, 1834, and at that time yielded two gallons and a half of milk per day. On the 30th of April she gave two gallons, and she was then spayed. She suffered little from the operation; her milk did not diminish, and she yields the same quantity to the present day. She has not shown any longing for the bull.

Case III.

A little cow calved on the 12th of April, 1834. Some days afterwards she yield two gallons of milk per day, and she was operated upon on the 13th of May. She seemed, for a considerable time afterwards, to be in a poor state of health; her skin became yellow; the hair fell off in patches, and particularly about her four quarters. She moaned sadly from time to time, and her appetite considerably diminished. The quantity of milk remained the same.

On June 20th she seemed to be really ill, and yielded, during seven days, little more than a gallon of milk per day. The quantity gradually lessened after that period, and continued to decrease until the end of July, when she was evidently dropsical. She was sometimes better and sometimes worse, until the 4th September, when she died.

Two pounds of a bloody serosity were found in the thorax. The lungs contained numerous tubercles; some hard, and even stony, and some soft, and others filled with purulent matter.

On opening the belly it contained, at least, seven gallons of a similar fluid. The fourth stomach and some of the intestines were softened and black, and the food contained in the first stomachs was fetid. The liver, enlarged and yellow, was softened, and it also contained many tubercles, hard or soft.

The womb was unaffected, except the extremities of the two cornua, which were of a yellow color, and hard. Few traces of the operation of spaying remained, unless in the sublumbar region, in which a spot of a blackish color was seen where each ovary had existed. A white tenacious tissue had united the incision made through the abdominal muscles, and caused the parietes of the abdomen to adhere strongly to the skin.

This examination after death proved that the cow was not lost from any morbid consequence of spaying, but from ascites, produced by the lesions stated, and which had existed before the operation.

Cases IV and V.

Two cows were operated upon in the month of May of the same year. One eight years old, and giving two gallons of milk per day, and that had calved on the 10th of April, was spayed on the 8th of May. She suffered from the operation, and did not give more than two or three quarts per day; but she soon recovered, and when the wound was healed, yielded her usual quantity, and which she continues to do unto the present period.

The other aged ten years, and that had calved on the 15th of April, and gave, a month afterwards, nine quarts of milk per day, was spayed on the 15th of May. In four days after the operation she gave again her usual quantity of milk; this increased to ten quarts, and she yields that unto the present day.

These cows showed a disposition for, and went to the bull several times after the operation; and, being incapable of conceiving, the œstrum [or heat] returns on them periodically. The first has been with the bull four times, and the other twice.

These five cows have continued to yield the same quantity of milk which they gave at the time at which they were spayed; and this, on a fair calculation of the usual gradual diminution of the secretion, is double the amount that would otherwise have been obtained in the whole period. We must not yet go further than this, but if cows that have been spayed should continue to yield such an extra quantity of milk as long as they live, the operation will be valuable indeed.

SKETCH OF THE PROGRESS OF AGRICULTURE IN VIRGINIA, AND THE CAUSES OF ITS DECLINE, AND PRESENT DEPRESSION.

An address to the Historical and Philosophical Society of Virginia, by EDMUND RUFFIN.

Prepared by request of the Executive Committee, for the Annual Meeting, in February 1836—and by resolution of the Society, ordered to be published in the Southern Literary Messenger, and the Farmers' Register.

Though fully sensible of the honor conferred on me by the request of the Executive Committee of this Society, to prepare an address on agriculture, it is with reluctance that the effort to comply is made—and nothing would have induced the attempt, but the fear that my declining the performance, would be attributed to any but the true motive. Heretofore, I have been accustomed to treat of such subjects as needed only to be rendered intelligible—of which, the manner and style were of far less importance than the matter conveyed—and for which a plain and even rustic mode of expression was not altogether inappropriate and inexcusable. The task now imposed on me requires abilities of a different and higher order; but still, for its execution, no aid will be sought in the grace and beauty of language. Being sensible of possessing no powers to draw from these sources, the fruitless attempt will at least be avoided.

But if no difficulty of this kind existed, others would be presented in the vast field embraced by the subject, and the impossibility of compressing it, or of doing justice to even any one distinct part, in an address as concise as the occasion requires. It is necessary to choose some limited portion only, for consideration: and therefore, my remarks will be confined to a hasty view of the progress of agriculture in Virginia, and the most efficient causes of its depression, and continued decline. Even for this detached portion of the subject, far more time and space would be required than this occasion will afford: and scarcely more can be presented than a copious table of contents—or the mere outline of a picture, which will be left for others to fill up and complete.

In a sketch so rapid, it is impossible even to name the many incidents and changes which government caused, during the early times of the colony of Virginia. These however would furnish many matters curious and interesting to the reader of history, or useful to the political economist, as illustrations of the effects of legal mis-directions of industry. [A.] Afterwards, when separate individual rights in lands were fully established, and the direction of industry was no longer materially influenced by law, nearly the whole agricultural labor of the country, and for a long series of years, was given to the culture of tobacco. In Europe, tobacco has never been raised in perfection; for however luxuriant the vegetation, and abundant the crops, the peculiar flavor which gives value to the product, has been always found deficient. This inferiority is certainly not owing to want of sufficient heat, or to any other defect of climate, in every region of Europe—and therefore, I infer that is caused by a general difference in the constitution of soil. Perhaps the deficiency of calcareous matter in the soils of Virginia, and generally also of her sister states, and its more usual diffusion through the best lands of Europe, have caused this one difference in our favor—a superiority however, of which the effect, as well as the cause, is subject for regret, rather than rejoicing.

Until times comparatively recent, there was but little skill used, (or required by purchasers,) in the tillage and after-management of tobacco. Steady and regular work, and nearly all of it of one kind at each separate period of the crop, occupied all the laborers on a plantation—so that but little intellect was required, either to execute, or to superintend, the several processes. The clearing of woodland engaged the labor of the whole force, every winter, and for months together, all at a time under the eye of the supervisor. The tillage was mostly performed by hand labor, because (under the existing circumstances,) it was cheaper than the extended use of the teams and expensive implements, and the accompanying varying and dispersion of labor, which belong to the most improved and perfect husbandry.

During the time of general tobacco culture in Virginia, there was no thought of increasing products by enriching the soil. New clearings of forest land were the only means used, both for extended tillage and increased products—and each new piece of land was planted in tobacco as long as it was able to bear that crop, and then in corn, until reduced to such a state of sterility as to induce the owner to throw it out of cultivation altogether, to be recruited, by nature's care alone, under a new growth of trees. The amount of cultivation for corn was barely enough to feed the laboring force—and that also was carried on by nearly or quite all the hands being employed together, and in the same operations. This is nearly the same kind of tillage that is necessarily adapted in every new "planting" country, whether the crops be of corn, tobacco, cotton or sugar —and however rude and imperfect, and even impoverishing to the soil, may be such a mode of tillage, it was wisely adopted under such circumstances as formerly existed in Virginia. It was the existence of similar circumstances in still greater strength, which forbade the general use of the plough, and even the cart, on the sugar estates of the West Indies, and which still makes the hand-hoe almost the sole utensil on some of the cotton estates of South Carolina. The error consists in continuing such rude tillage after the circumstances which required it have ceased—and such has been the error probably in all the cases cited. In a new country, where land is cheap, and labor dear, it is good economy so to direct tillage that each *laborer* may be able to yield the greatest product, (without much regard to the land—) and also, in such manner that as little intellect as possible may be necessary in the operative class. This rude kind of culture, and the employment of slave labor, are well suited to each other: and there can be no doubt, but that by the general use of slave labor, Virginia, while a *planting* country, was greatly benefited—and that her wealth and prosperity were greatly more promoted, than they would have been without slaves. Nothing will make the lowest class of laborers industrious, in any country, but *compulsion*—whether it be presented in the form of hunger and cold, or the power of a master. Where land is fertile and cheap, and the climate mild, and the necessaries of life attainable with little effort, more than half the laboring power of the country would be wasted in idleness, without the institution of personal slavery. It is this institution (though not so named,) that has made the rapid growth and prosperity of the *convict colony* of New South Wales a theme of admiration and astonishment—though the bondsmen were of the most worthless kind: and the recent destruction of slavery in the British West Indies will surely and speedily reduce these heretofore productive and flourishing islands to a worse condition than New South Wales would have exhibited, with a *free* population, composed (as her's was) of vagrants and felons. In every country of modern Europe, personal slavery has existed—and it has no where ceased, by operation of law or otherwise, until manifestly opposed to the interest of the masters. Long after its end in Scotland, and in comparatively a modern time, such was the state of poverty, idleness, and misery of a large portion of what ought to have been the *laboring* poor of that country, that Fletcher of Salton actually recommended the institution of *personal slavery*, as the best remedy for the evil. Yet the general poverty of soil of Scotland, and its severe climate, rendered it one of the most unfit regions for slavery—and Fletcher, however mistaken in this respect, was an enlightened patriot, and a true lover of liberty. These facts are some of the many proofs that slavery is not always a political evil—and that its cessation, even by universal consent, has not always been considered a blessing.*

But nothing in society can be considered as permanent; and the circumstances which make slavery beneficial are not exceptions to this general rule. These circumstances begin to change as the agriculture of a country becomes highly improved. In a "farming country," the dearness of land requres that the owner should especially economize that portion of his capital. Improved processes, and extended and varied culture, make it necessary to disperse the laborers on every farm, and greatly to vary their employments. Then mental power is no less wanting than physical force. The ignorant slave who could well and profitably wield the hoe or the axe, under continual supervision, and the ignorant director of the work, who had only to see that it was "kept moving," become equally unfitted for the new and more prefect operations—and if they continue ignorant, they will always remain unfit agents for operations which, if properly conducted, would be greatly superior in effect and in profit. It is for this simple cause, that loss, instead of profit, so often attends the introduction of improved systems of farming—and the blame is generally laid to the defects of the system itself, when it is altogether attributable to the unfit agents and means employed.

But though I dissent from the very general condemnation of the earliest and rudest system of husbandry in Virginia, no one more reprobates its

*The biographer of Fletcher of Salton, though strongly disapproving many of his political opinions, and his devotion to liberty, which are treated as tending to the extreme of republicanism, still bears ample testimony to his talents and worth. The sketch of his life in the Edinburgh Encyclopædia contains these passages. "Andrew Fletcher, of Salton, was a statesman and patriot of the highest order; and though Scotland, his native land, was the chief object of his exertions, yet, wherever the love of country and of liberty prevails, he deserves to be remembered with respect and gratitude."——"Fletcher was endowed with high talents, great courage, integrity, generosity, and temperance. On the purity of his intentions as a patriot, the exertions and sufferings of his life form the best commentary. He was a most elegant scholar, and an accomplished orator. His speeches are remarkable for their plainness and energy—and form, by their brevity, a striking contrast to the wordy eloquence of the present day."——"His *Two Discourses on the Affairs of Scotland* were written in 1693, when, in consequence of some years of barrenness, a scarcity, or rather a famine, existed through the land, and occasioned the most severe sufferings to the lower classes. The author declares, that besides those who were scantily provided for out of the church [or charity] boxes, there were at the time when he wrote, not less than 200,000 persons in Scotland begging from door to door; 'and though' he continues 'the number of these be perhaps double to 'what it was formerly, by reason of this present distress, yet in all time there have been about 100,000 'of those vagabonds, *who have lived without any regard 'either to the laws of the land, or to those of God and 'nature*.' He tells us also, that when he considers the many excellent laws enacted by former parliaments, for setting the poor to work, *contrasted with their utter inutility*—when he considered farther, that *all the other nations of Europe* (Holland alone excepted) *groaned under a similar pressure*, he was led to believe that neither the cause nor the remedy of the evil had been discovered. As no such evil had been complained of by the classical writers of antiquity, *and as much poverty was the consequence, in Europe, of the manumission of slaves by their Christian masters*, he gravely supposes that the *existence of slavery was the cause of the comfort and industry of the lower orders* in former times. It will hardly be credited by those who are acquainted with his high notions of political rights, and his constant jealousy of the power and ambition of princes, that he proposes *reducing all those persons, and their posterity, to slavery*, by a solemn act of the legislature, that on the one hand they might be *compelled to work*, and on the other, might be *insured the necessaries of life*."

It is not in approbation of, or concurrence with, this remarkable opinion of Fletcher, that it is here quoted. That his view was erroneous, and that his proposed remedy would have been most impolitic, (without naming objections on other and higher grounds,) is readily admitted. But that such opinions should have been entertained, and zealously asserted, by one who so well deserved respect as a scholar, a statesman, a patriot, and a philanthropist, is enough to establish the fact that the abolition of personal slavery in Europe, and even in so inhospitable a region as Scotland, together with its undoubted advantages, was attended with many great and long continued evils to the community, and, more especially to the very class relieved from slavery. The evils of slavery, such as they are, bear most heavily on the master—and the evils of emancipation, on those who were the slaves.

being continued beyond the proper time for a change to better farming. With the usual obstinacy of adherence to old practices, tobacco continued to be the principal market crop in lower Virginia, until the interruptions of commerce, which preceded and accompanied the last war with England, reduced the price to less than what hay sold for soon after, for the support of cavalry horses.* In this, as in other cases, political compulsion, more than reasoning and proper estimates of profit, drove us from the old general system of tobacco culture. It is now continued only in the middle and upper parts of Virginia; and the processes for its preparation for market have been there so greatly improved, that much skill and judgement are required, and are exercised, for the profitable management of the crop.

Wheat was long in taking its place as a large crop—and would have been longer, but for the very high prices, (sometimes $2, and even $2 50 the bushel,) caused by the general war in Europe. The crops were at first so foul with weeds, and the grain so badly cleaned, that such would not now be marketable. Then came the ravages of the Hessian fly, which diminished the quantity of the crops, as much as slovenly preparation injured the quality of the grain. But improved tillage, and greater care, have served to compensate all such causes of loss, and have made the wheat crop of Virginia, and of the James River lands especially, a most important item of the total agricultural products of the state. This culture, however, which was so difficult to be established on a proper footing on our lands the best adapted to it, was next, by blind imitation, extended to almost every farm, even though the least suited to wheat, by the composition of the soil. Some proportion of lime is essential to constitute a good wheat soil—and very little land in Lower Virginia, naturally possesses that proportion. Still, so much and so peculiarly are the tillers of the soil the creatures of habit and example, that the culture of wheat was long persisted in, in spite of frequent failures, and general ill success, on soils altogether unsuited. At last the season of 1825, so fatal throughout the eastern half of Virginia, did not leave enough of good wheat on many farms, to again sow the fields—and that circumstance, more than reasoning and previous experience, induced wheat culture to be abandoned on the soils least suited to it, and its place to be occupied by the then novel field culture of cotton.

Indian corn has always constituted much the greater part of the food of the people—and with its offal forage, the food also of our live-stock. Hence it is the most important crop for its abundance and value, though its great home consumption makes its export but of small amount.

Cotton, as has been already stated, was introduced but recently in Virginia, as a field crop—and its long previous disuse, and its now successful and wide extended culture, present another striking example of the slowness with which new truths in agriculture make progress. During the last war, when our coast was blockaded by hostile fleets, all the cotton that supplied the northern factories was conveyed through Virginia, in wagons, over the worst of roads, and sold sometimes even here at 37 cents the pound. None of us then thought of making it as a crop for sale, though neither our wheat, corn, or tobacco, would then bring remunerating prices. It had long been usual on almost every farm to cultivate a little "patch" of cotton for domestic supply—but such small culture is seldom otherwise than neglected, and therefore unprofitable—and thence grew the general opinion that it would be in vain to attempt the culture of cotton on a large scale. Since, it has become the principal market crop of several of our southern counties—and yielded fair comparative profits, even when as low as 10 cents the pound.

Still more slowly, after its first dawning, was a general system of good farming established any where in Virginia. Though there are now many farms that may vie with any in the world in good management, and profitable returns, (considering the difference of existing circumstances,) it must be confessed that over a large portion of our territory, the good farming which is founded on, and mainly consists in, economy of means and fertilization of the soil, has yet to be introduced. Much has been done for improvement, for profit, and as example, by many of our enlightened farmers—but a thousand times as much still remains to be done—and from the neglect of which, our country at large is losing, or wasting, continually and enormously.

Manuring, the basis of good farming, until a time comparatively recent, was almost entirely neglected—so much so, that the opinion generally prevailed that putrescent animal matters (the effects of which no one could avoid observing,) were alone worth being used for the purpose of enriching land. To the illustrious farmer and patriot John Taylor, Virginia is mainly indebted for the removing of this gross, but widely diffused error. From his writings, and from the practice of other still more successful, but less celebrated improvers of the soil, it became known that far greater resources for fertilization existed in the almost unlimited amount of vegetable matter. This was no more than was previously known to all well informed agriculturists: but a remarkable practice founded on that general truth was scarcely known in Europe, because inapplicable where land has been highly enriched, and the processes of agriculture have reached a high state of perfection, though most valuable in a region of poor and low priced lands, and where labor and floating capital are scarce. This is the "enclosing system," or the prohibition of grazing the fields when not under tillage, by which the land is enabled to manure itself by the decay of its own vegetable growth. This was a great step towards improvement, (on suitable soils,) even when the covering of the fields consisted merely of the natural growth of common weeds—and far greater was the benefit when clover was substituted, which furnishes the richest possible coat of vegetable manure. When this system is adopted on soils suited to clover by nature—or made suitable by the use of calcareous manures—and still more when the mysterious and wonderful aid of gypsum is added—the farmer has found resources for any amount of fertilization that his industry and intelligence will secure. As vegetables, especially of

* Immense quantities of common tobacco were sold at less than $2 the 100 lbs.; and hay of very inferior quality, from natural wet meadows on the writer's farm, was bought and shipped to Norfolk during the war, and sold there at $2 50, the 100 lbs.

the clover tribe, feed on, and draw their growth and substance from air and water principally, if they are left to rot on the soil, they return to it much more enriching matter, than they had previously taken up for their support. This vegetable manuring is in itself a vast source of fertilization—but may be greatly increased by adding, in proper manner, the rearing of live-stock, and use of prepared manures. The attention which has but recently been directed to the use of calcareous manures, has already been productive of signal benefits—and every year's experience will serve the better to establish the necessity for their application, and the immense profit thus to be obtained, on our soils that are so generally deficient in that ingredient which is essential to a high grade of value and productiveness.

The observer of the progress of agricultural improvement in Virginia, may remark that the introduction of almost every new and profitable practice has been caused by means that amounted to compulsion—and rarely, if ever, has a general change been produced by the clearest reasoning, if not attended by the pressure of necessity. Thus, it required long continued and ruinous low prices to stop the general and injudicious culture of tobacco in lower Virginia—and the almost total destruction of the wheat crop throughout an extensive region, to prove that it was altogether unsuited to the soil. We may therefore hope that there still remain great blessings, in other new kinds of culture, to be *forced* on our acceptance by some supposed calamity, but real good. Thus, sheep husbandry, (which now the *dogs alone* can effectually prohibit,) and silk culture, may possibly be established with profit; and by such or other similar means, a prosperous population may be renewed in the central region, where emigration seems now to threaten a wide-spread waste. If it was possible that such a *calamity* could occur, as that we should be entirely shut out from the rich lands of the west, we would be *forced* to learn the value of our own position and resources, and the immense profits to be obtained by remaining contented at home, and making the best of the advantages offered by the land of our birth.

I shall now state more particularly the several causes which are most operative in repressing the improvement, and serving to prostrate the interests of agriculture.

I. The first cause in order, though not in grade, of injury to agriculture in Virginia, is the continuing too long the early and exhausting, as well as rude system of tillage, which was necessarily and properly adopted when our country was generally in the forest state. The error of too long a continuance of this course, was not so important (as is often asserted,) as to have blighted agricultural improvement over all the state. If no other and greater errors had existed, this one, the result merely of want of information, would have cured itself soon enough, in every case, to prevent any serious loss to individuals, or to the nation. This error has not operated alone, but has been aggravated, and endowed with its evil power, by other errors, which will be named hereafter.

II. A very mistaken opinion has prevailed generally as to the improvable nature of soils—and this mistake has served to misdirect effort, and to disappoint, and render profitless, the attempts of the most energetic farmers to enrich poor soils. It is but a late discovery that nearly all the soils of Virginia, (and it is believed also of all the Atlantic States,) are singularly wanting in lime as a natural ingredient—and it is yet but little known, that without a certain proportion of that ingredient, all efforts to fix new fertility in soil are vain. As a consequence of these positions, the adding the ingredient which is wanting will be the more effective and profitable, in proportion to the previous deficiency: and if our tillage in general has yielded profit, under this great and remarkable defect, far more profitable must it be, after that defect shall have been removed. The ignorance of these important truths, is here and elsewhere one of the greatest obstacles to agricultural improvement. It is in vain to prescribe remedies for a disease, so long as its cause is totally unknown to the physician—and even if the only effectual remedy is found to be unattainable, it is better that the truth should be known, than to persist in a vain and profitless pursuit. But nature has not been niggardly in offering means for applying this remedy to the lands of Virginia. Large portions of the state are abundantly supplied either with fossil shells, or limestone—and recent discoveries give hopes that similar means may be found in, or cheaply conveyed to, much of the most destitute region. Geological surveys and investigations may add incalculably to the one benefit—and the new and great facilities for transportation offered by canals and railways, will perhaps as greatly promote the other.

III. A third cause of injury to agriculture, and one which acts upon and aggravates all other causes, is the total absence of every thing like agricultural instruction, whether practical or theoretical. If in any other great and complicated business, it was the universal course for capitalists to commence as undertakers without any knowledge of the theory or principles—and to engage operatives and superintendents who were equally ignorant of the practical details—and that for all to acquire the knowledge wanted, reliance was placed solely on their subsequent untaught operations—in such cases, every voice would pronounce that the business must inevitably result in bankruptcy and ruin. Yet such is the case, nearly to the letter, in almost every agricultural business in Virginia, whether on a large, or small farm. Of the former, the wealthy young proprietor is educated far from his future property, and receives instruction almost exclusively in dead languages, and sciences designed never to have any practical application to his future pursuits—and perhaps afterwards he adds thereto more or less of study, (on the pretence of it,) of law or medicine—and having arrived at manhood, he throws all aside to undertake the new business of farming. Still, a rare and admirable aptitude for the pursuit may sometimes enable a proprietor to overcome all the disadvantages of his own ignorance, and that of his agents, and to succeed in spite of such enormous obstacles. But because some few such cases are before us, it is a great and dangerous mistake to suppose that good farmers can be thus formed, in all, or in many cases. It would be as rational to infer that all education in literary and scientific institutions was unnecessary, because, without such aid, a Franklin could reach the highest station of celebrity and usefulness.

But however great may be these disadvantages of the wealthy farmer, they are as nothing compared to those of the far more numerous class of men of small possessions, and of more limited education. The former has leisure, and various facilities to gather information from others. Travel, books, frequent and varied association with his fellows who are better informed, (or who even if alike ignorant, are alike striving to gain knowledge,) all serve to aid his improvement. But the small farmer who is confined to his daily toil, has no such means, and can rarely acquire knowledge from others, if surrounded by such as are in circumstances similar to his own.

So much for the proprietors of farms, and general directors of farming. But of necessity, all extensive and complicated operations must be under the immediate direction of agents—and in our farming, these agents, the overseers, are without any previous training for their business, and of course deplorably ignorant, even if not in other things deficient. This alone would present a sufficient cause for failure, even if the proprietor is not wanting in ability as a general director—unless indeed, (as is usually the case,) such capable proprietors are in a great measure their own overseers, or have to undergo the drudgery of their business, and attend to those details which properly belong to the care of subordinates. But however low our overseers deserve to be ranked, as a class, there have been among them a few distinguished exceptions—men, who however humble was the commencement of their career, have earned, and well deserve to enjoy, the applause and high respect of their countrymen in general. The distinguished place in society to which some such men have honorably risen, by their knowledge and success as farmers, shows that the reward of reputation, as well as of wealth, may be surely attained by such meritorious exertions.

This cause of the degradation of agriculture—*ignorance*—is more subject to the control of government, than any other—and therefore it is more important to dwell on its baneful influence, and to suggest remedies for the evil.

If agricultural professorships were established in our principal institutions of learning, young landholders who are there acquiring liberal educations might easily obtain a competent knowledge of the general principles of agriculture, without sacrificing the other useful parts of scientific instruction. If this object would not be a sufficient inducement to remain one more year at college, it would be an advantageous exchange in such cases, if the study of theoretical agriculture, and its connexion with chemistry and some of the branches of natural history, took up the time usually devoted to metaphysics and the higher branches of mathematics—the study of which will be of use to but few men, except as a good mental exercise—a kind of *gymnastics* for the mind. It will be easy to ridicule the agricultural instruction that could be acquired from the lectures of a professor—a mere man of books and of theory. But though it is freely admitted that no such course of instruction, *alone*, could make a farmer, yet it would be the best preparation for the future acquisition of practical knowledge. It would be folly to look to the lectures of a professor for instruction in practical operations: but we might expect them to furnish the general and true principles of agriculture and its kindred sciences, (so far as they are connected,) without some knowledge of which no man can avoid committing continual blunders, and meeting with continual losses, as a practical tiller of the earth. For example: a farmer cannot know whether he is proceeding right or wrong in the very important operations of preparing, preserving, and applying manures, without some knowledge of the chemical ingredients of the materials used, of the changes produced by fermentation, and of the functions of the plants which are designed to be fed, and of the composition and properties of the soil intended to be enriched. Even a *little* knowledge on these points would serve to guard against serious waste and loss on every farm—the total amount of which makes an hundred fold greater national and annual loss, than all the expense of agricultural professorships, and of every other means for instruction that I shall advocate.

Experimental farms, under proper direction, would also serve a most valuable purpose for increasing general agricultural information. But it would be a mistake, fatal to the object in view, if such establishments were expected to present a system of pattern husbandry, or even to yield any clear pecuniary profit whatever. Such expectations would necessarily be disappointed—and thus would cast discredit on the whole plan. Experiments, if judiciously conducted, and accurately reported, would be more effectual than any other means for conveying valuable information to the agricultural community. They *cannot* be made extensively by private individuals—for the plain reason that they require too much expense of time, labor, and money, and in general, are attended with loss, even when the results are most valuable for the information they give. A farmer might lose $100 by making a series of experiments, of which the results might be worth $100,000 to the community at large. Hence, it is in vain to hope for such proceedings, unless induced and supported by the funds of the community—and it is foolish to count on deriving direct and immediate profit from experiments, whether conducted by public bodies or private individuals. Yet this foolish expectation is very general—or at least it is commonly deemed sufficient ground to condemn and ridicule any experiments as worthless, if their immediate result is loss to the inquiring and public-spirited individual who instituted them. Yet who ever counted on deriving direct pecuniary profit from any course of experiments in chemistry or natural philosophy? And without many such costly and losing experiments, the world would not have obtained the benefits of the steam engine, of the machinery for spinning and weaving cotton, the modern processes of bleaching and coloring, and hundreds of other improvements in the arts. If judged by the test of profit, as usually applied to agricultural experiments, Watt and Fulton, and Arkwright, would have been pronounced mere fanciful schemers, if not fools, not only because of the expense of their experiments, but perhaps because neither of them could bring into operation the mechanical skill, and habits of business, necessary to the highest perfection and greatest profit of their splendid discoveries.

It has often been recommended, and by high authorities, that *pattern farms* should also be established, to teach agriculture by example. This I should strongly oppose—and for the reason that, from necessity, what might be *named* a pattern farm, would prove to be any thing but an exhibition of good and profitable husbandry. Instead of attempting such an establishment, it would be better to make use of, as an additional course of *practical* instruction, the now existing farms of many private individuals, which are truly patterns of good and profitable management. Many such farms might be named, deserving this character, in various parts of Virginia. It is evident that no one of them, even if managed in the most perfect manner, according to its location, and the peculiar circumstances of its proprietor, could serve as a general pattern farm. But one, for example, might exhibit a pattern for clover fallow and wheat culture, on the singular and valuable "red land" of the Southwest Mountain slopes—another for the same, on the rich, flat loams of James River—another, would show the profitable combination of tillage and grazing west of the Blue Ridge—another, the best mode of tilling and enriching the more sandy lands of Lower Virginia—and all might accord in some common points of resemblance, in addition to the merit of excellent general management. The proprietors of such farms might very properly be considered as adjunct and practical professors of agriculture; and would render important services as such, by each receiving in turn, as pupils, two or three of the young men who had previously passed through the course of theoretical instruction. On these farms, and under such instructions, a young man could learn more of practical and profitable agriculture in a few months, than from his own solitary and unassisted efforts continued throughout a long life. [B.]

IV. Another and very important source of injury to agriculture is presented in the frequent and extensive changes of the boundaries of farms, which are necessarily made by the conflicting "see-saw" operations of our law of descents and law of enclosures—the first, for the purpose of legal division among heirs, compelling single farms to be cut up into several distinct shares of far less *proportional* value, because each is totally unfit for a single property—and the second, compelling the impoverished owners to sell their shares as they successively come to possession, or can find rich and contiguous purchasers, and thus to form newly arranged large farms out of four or five small ones. I mean not here to dispute the alleged political benefits of this cutting-up and piecing system—nor to inquire whether national liberty and popular rights might not have every existing security, without paying this ruinous tax, this never ending tribute from individual and national wealth, for their preservation. It is enough here to state that this impediment to agricultural prosperity exists—and it will scarcely be required to maintain the assertion, by argument or illustration. It is not the old and long debated contest as to the comparative advantages of farms being either generally large, or generally small. Both kinds have their respective advantages, and also their disadvantages, and the agricultural interest of the country demands that there should be farms of every size, not too large for one man's superintendence, or too small for one man's profitable employment. It is not to the sizes and boundaries of farms, as existing at any one time, that the objection applies—but to the continual changes of both, not required by the interests and wishes of proprietors, but compelled by the operation of law. A well arranged farm, whether large or small, can rarely be divided, or be consolidated with others, without great loss of labor expended for previous arrangements, which are rendered useless by the change of limits. This loss is compensated by no gain whatever, to other individuals, or to the commonwealth. When one-tenth of the value of a farm is destroyed by its being divided, or of a cluster of distinct farms, by consolidation, (and how rarely is the loss of less amount?—) that loss is absolute and complete to all parties—to sellers, buyers, and to the nation—as much so as if one-tenth of the land had been swallowed by an earthquake. The labors of another generation may, by new improvements, create a new, and even greater value—but cannot recover any part of what was lost. It would be far better if every farm, which was not divided by the will of its deceased owner, was sold entire, with its stock of every kind, and the proceeds divided among the heirs.

V. The inducement and bounty offered in the cheapness of lands, for emigration, forms another evil of great magnitude to the agriculture and welfare of Virginia. Every dollar taken off of the price of the government land in the west, probable serves to take twice as much from the selling price of ours'. If the present *minimum* price, $1 25 for public lands, was reduced to nothing, the lands of inferior quality in Virginia would not sell at all. This long existing, and probably increasing evil, is not only beyond the control of individuals, but also of our state government. We have only to hope for the best, and fear the worst results, in this respect, from the future action of the federal government.

But it is not the cheapness of the new western lands, nor their rich products and profits, that alone would serve to prostrate the prices and estimation of ours', and to discourage the most profitable investments and improvements, if these causes were not given a ten-fold strength by a generally prevailing madness for emigration, compounded of discontent with the really attainable advantages of our native land, and a credulous and too confident faith in the remote and untried blessings that are promised in the west. It is in vain that rich blessings are offered to our acceptance at home, if they are undervalued and despised. The fact cannot be disguised—Virginia is losing by emigration, not only in the population and wealth that are pouring out as a flood, but because what goes out of the state serves to lessen the value of all that is left behind. The most signal improvements that have been made in our agriculture, and the greatest profits thence derived, do not cause any general enhancement in the market price of lands, or serve to give a new impulse to general agricultural improvement and prosperity. Such particular improvements have merely served in some measure to stay our downward career, and therefore, their effects, however great and profitable, are not properly estimated, and indeed are not extensively known. Virginia is likely to be reduced to a condition that will need all the patriotism, zeal, and talents, of her remaining sons, to prevent their country becoming waste, and almost abandoned.

There is only one little spot in Virginia over which this mania for emigration has not spread its malignant influence, and among the residents of which there exists generally a true love for the land of their birth. This is the narrow peninsula east of the Chesapeake—and the remarkable difference there exhibited, shows the rich reward which follows mere contentment and industry. With a soil that is generally far from fertile, and where their valuable means for fertilization have been but little used, the lands sell high, rent high, and both landlords and tenants are satisfied, comfortable, and thriving. There is no peculiar cause for this state of things, except that for this people it may be said that *there is no "western country."*

But however heavily all these evils may press on the interests of agriculture, there also exist abundant inducements to exert our energies to throw off the burden. If even partial success should reward the effort, the agriculture of Virginia might reach a point of very high improvement and prosperity. Let us keep in view continually the causes which have depressed agriculture, and now prevent its rising from its fallen state—and let us also look to the glorious and rich reward offered for successful exertions for relief. Fallen as it is from its former high estate, Virginia is still a country to be proud of—a rich inheritance, for which we have reason to be most thankful for possessing. A large proportion of the soil of the state is naturally and highly productive—and there are many farms, and some districts, of which the general husbandry may be compared with the best of the United States. The ruggedness of a large part of the mountain region is well compensated by its fertile soil and mineral wealth—its beautiful scenery, and pure, invigorating air. The low country, though generally poor, is as susceptible of *profitable* improvement as any region whatever—and on that account, as well deserves as the rich west itself, to be the object of speculators, treasure hunters, and builders of castles in the air. The intermediate region possesses in some, but a less degree, the advantages of both its western and eastern neighbors. In addition—all parts of the state are now about to derive the advantages of a general system of inland transportation, which seems now, for the first time, placed on the only stable foundation—that is, of yielding early and sufficient profit to the constructors, or stockholders, of canals and railways, as well as of general benefit to the country at large. Above all—as a ground for hope—Virginia's best product has always been of *men*—and though her sons have deserted her soil in such numbers as to furnish half the population of the new western states, still the *stock* remains at home, in its original purity and value. There are abundant means still remaining for the high improvement and permanent prosperity of this commonwealth—and nothing will be wanting to produce that result, unless it be the *will*, and the *resolution*, to use the offered means.

The great evils which serve to prevent agriculture being prosperous in Virginia, may be summed up in the single word, *ignorance:* but however heavy may be this burden and curse on a nation, its importance cannot be appreciated, and therefore will never be complained of, by the great mass of any people. The more dark and widespread may be the cloud of ignorance which ages of misrule may have caused to overshadow a country, the more contented will be the mass of the people with their destitution of light. In benighted Spain and Turkey, rebellions for unnumbered wrongs, are matters of every day occurrence: but not a complaint has been uttered, or even the ground for it suspected, that the governments of these countries have permitted and caused the almost extinction of knowledge—which is the fruitful source of all the other evils felt. The few persons who may understand the cause, are utterly powerless for its removal, or mitigation.

In the legislature of Virginia only can be found combined the *intelligence* to know, and to properly estimate, the evils which are crushing our agricultural interests—and the *power* to guard against, or to remove them. To the sense of justice and of policy, no less than to the patriotism of that body, we have to appeal—and upon the success of that appeal, sooner or later, will depend whether Virginia is to rise—or to sink, without a remaining hope. The *will* of the legislature alone will be potential: the mere disposition to grant aid, if earnestly felt, and barely commenced to be put in action, will soon ripen into a judicious and effective general system for the resuscitation and support of agriculture, and of agricultural interests. And the cost of these measures, (the only, but great obstacle—) will merely be a sum utterly contemptible compared to the value of the least of the expected results—and much less than of many customary legislative proceedings of the least possible value. The legislative expense of selecting a person to perform the mere ordinary mechanical services of a printer, has, for two sessions, been as great as would well support a professorship for the two years. No richer endowments need be desired for agricultural professorships, and for all such other aids to agricultural knowledge as are now wanted, than to divert to these ends, the cost of barely three or four days of the *excess* of debate of every legislative session—or of the tenth part, only, of the average expense of discussing abstract political, or mere party questions, or resolutions, which have led to no *direct* results whatever; but of which the *indirect* effects, for twenty years past, have been becoming more and more destructive of the true interests of Virginia.

APPENDIX.

Many of the circumstances which affected the early condition of agriculture in Virginia, and which were necessarily excluded by the proper limits for an address (and one of secondary importance) to a public meeting, are yet highly interesting. Extracts exhibiting such will be embraced in the first of the following notes—none of which (it is proper to say) were attached to the foregoing address, when sent in to the society by whose order it was prepared, and is now published.

NOTE A. page 748.

From the first settlement of Virginia, in 1607, until 1613, there was no such thing as distinct landed, or indeed other private property which was the fruit of individual labor or enterprise. This was one of the many unwise provisions of the charter of the London Company, (the corporation that settled and owned Virginia until its dissolution in 1624,) or of the regulations made by that body—and this plan of having the settlers to labor in common, and without holding private property, would alone go far to account for the previous feeble and often suffering condition of the colony.

"Each individual put the fruits of his labors into the common stock, and industry and indolence were thus placed on the same footing. The disadvantages of such a procedure must be obvious. This was a property too vague and uncertain, to stimulate the enterprise and industry of the owner. The foresight of Dale put a stop to this evil; and though his remedy is partial and defective, it must still be considered as the dawn of civilization."—*Burk's History of Virginia, vol. 1. page 172.*

"The most honest and illustrious would scarcely take so much pains in a week, as they would have done for themselves in a day; presuming, that however the harvest prospered, the general store must maintain them; by which means, they reaped not so much corn by the labor of thirty men, as three men could have produced on their own lands."—*Purchas.*

"And now the English began to find the mistake of forbidding and preventing private property: For, whilst they all labored jointly together, and were fed out of the common store, happy was he, that could slip from his labor; or slobber over his work in any manner. Neither had they any concern about the increase; presuming, however, the crop prospered, that the public store must still maintain them.

"The five years also, prescribed in his majesty's instructions, under the privy seal, for trading altogether in common stocks, and bringing the whole fruit of their labors into common store houses, were now expired. Therefore, to prevent this inconveniency and bad consequence, Sir Thomas Dale allowed each man three acres of cleared ground, in the nature of farms. They were to work eleven months for the store, and had two bushels of corn from thence; and only had one month allowed them, to make the rest of their provisions. This was certainly very hard and pinching; but his new and favorite settlement at Burmudas Hundred had better conditions. For once month's labor, which must neither be in seed time nor in harvest, they were exempted from all other services; and for this exemption, they only paid two barrels and a half of corn, as a yearly tribute to the store. However, the prospect of these farmers labors', gave the colony much content; and they were no longer in fear of wanting, either for themselves, or to entertain their new settlers. —*Stith, p.* 131.

Having commenced at this great cause of previous mishaps, I now return to note some of the most remarkable or interesting events that relate to the early agriculture or general economy of the colony of Virginia.

The ships which brought the first settlers, entered the Chesapeake on April 26th, 1607; and the landing at Jamestown, to make a permanent settlement, was on May 13th. No corn or other crop was made until the following year—and then but a very scanty supply. Within one month after the return of the ships to Europe, June 22, 1607, fifty of the settlers died from sickness caused principally by want and unwholesome food. "The survivors were divided into three watches, and subsisted on crabs and sturgeon till September," when new supplies were received from England.

"About this time also, there sprang up a very troublesome sect of gold finders, which was headed by captain Martin, and warmly embraced by Newport. There was no thought, no discourse, no hope, and no work, but to dig gold, wash gold, refine gold, and load gold; and notwithstanding captain Smith's warm and judicious representations, how absurd it was, to neglect other things of immediate use and necessity, to load such a drunken ship with gilded dust; yet was he overruled, and her returns made in a parcel of glittering ore which is found in various parts of the country, and which they very sanguinely concluded to be gold dust: And in her they sent home Mr. Wingfield and captain Archer, to seek some better employment in England, for they had assumed many empty titles of offices here, as admirals, recorders, chronologers, justices of the peace, and of the courts of plea, with other such idle and insignificant pretensions."—*Stith, p.* 60.

After the third crop season, and second actual harvest, the agricultural condition of the colony may be gathered from the following statement, which the historian evidently presents as highly prosperous: and indeed, so it was, compared to the state of things before, and after the end of the administration of Capt. Smith, but for whose conduct the very existence of the colony would have been lost.

"And thus, about Michaelmas, one thousand six hundred and nine, Captain Smith left the country, never again to see it. He left behind him, three ships and seven boats; commodities ready for trade; the corn newly gathered; ten weeks provision in the store; four hundred ninety and odd persons; twenty-four pieces of ordnance; three hundred musquets, with other arms and ammunition, more than sufficient for the men; the Indians, their language, and habitations, well known to an hundred trained and expert soldiers; nets for fishing; tools of all sorts, to work; apparel, to supply their wants; six mares and a horse; five or six hundred hogs; as many hens and chickens; with some goats, and some sheep. For whatever had been brought, or bred here, still remained. But this seditious and distracted rabble, regarding not any thing, but from hand to mouth, riotously consumed what there was; and took care for nothing, but to color and make out some complaints against Captain Smith."—*Stith, p.* 155.

But the miserable crops made under the joint-labor and common-property system, and the larger supplies of food received from England, were insufficient without the corn obtained in trade, (or by fraud or force,) from the natives. War, soon after Smith's departure, cut off this supply.

"Famine now made its appearance, attended with circumstances at once melancholy and disgusting: Food, the bare idea of which, during better days, had created loathing and disgust, was now seized on, with greedy and bestial voracity."—*Hist. of Va., p.* 157, *vol.* 1.

"Those who had starch, made no little use of it, in this extremity; and the very skins of their horses were prepared, by stewing and hashing, into a dainty and welcome food. Nay, so great was the famine, that the poorer sort took up an Indian, that had been slain and buried, and eat him; and so did several others, one another, that died, boiled and stewed with roots and herbs: And one, among the rest, killed his wife, powdered her up, and had eaten part of her, before it was discovered; for which he was, afterwards, severely executed. In short, so extreme was the famine and distress of this time, that it was, for many years after, distinguished and remembered by the name of the starving year."—*Stith, p.* 117.

"In the midst of the distresses of the Virginia colony, the remembrance of Smith obtruded itself, awakening in them bitter regrets for his loss, and calling out severe reproaches on themselves, for their baseness and ingratitude. From five hundred, their number was soon reduced to sixty men, women, and children: and this miserable remnant, could not reasonably calculate on the security of a single hour, from the assaults of the savages, even though by some miracle they should escape the agony of disease, and the torments of famine.

"In this forlorn condition, they were found by Sir T. Gates and Sir G. Somers, who, on the twenty-fourth of May, arrived in two barks, built with such materials, as they could find in Bermudas, assisted by the wreck of their own ship. It required them but little observation, to be convinced of the inadequacy of their means to remedy an evil so woeful and extensive; and after a short consultation, it was unanimously determined to abandon the enterprise. The colonists, with whatever was most valuable, being embarked, the ships dropt down the river to Mulberry Island: So near to entire extinction, was the germ of this mighty nation."—*Hist. of Va., p. 159, vol.* 1.

"The colonists were importunate to burn the town and fortifications; but God, who did not intend that this excellent country should be abandoned, put it into the heart of Sir T. Gates to save it."—*Stith, p.* 117.

A boat met them before they reached the mouth of the river, and announced that Lord de la War's fleet was near at hand, bringing reinforcements, and every needful supply. Under his command the wretched fugitives returned to the deserted walls of Jamestown.

"But while the Virginia establishment was thus almost miraculously preserved by the arrival of Lord de la War, a danger of no less magnitude awaited it in the impatience of the company in London, and their inordinate expectations of immediate profit. It appears, that the genuine commercial spirit, which works by bold enterprise and patient industry, was debauched at this day, by the bewitching reports of Spanish discovery; and the value of distant possessions, was estimated by the mines of rich metals they were supposed to contain. Disappointed in their expectations of discovering a Potosi in Virginia, the question was seriously discussed, whether the enterprise should not be abandoned. But the testimony of Sir T. Gates, solemnly given in at one of the quarter courts, backed by the representations of Lord de la War, who published a treatise on the occasion, removed the veil, which ignorance and misrepresentation had drawn before the eyes of the company; and it was determined once more, to prosecute the enterprize with spirit and activity.

"Sir T. Dale, with three ships abundantly supplied with all necessaries, arrived the 10th of May. He found the colony, as usual, indolent and improvident. To those vices their mode of living had added a disposition to mutiny, which being general and habitual, it was more difficult to repress."—*Hist. of Va. p.* 162, 165.

These "representations" of Lord de la War, (made no doubt in sincerity, and what he thought truth,) will show that in that day "western country" descriptions were at least as highly colored as those which now are drawing away the people of *this* land of milk and honey.

"The substance of these representations was, that the country was rich in itself, but that time and industry were necessary to make its wealth profitable to the adventurers; that it yielded abundance of valuable woods, as oak, walnut, ash, sassafras, mulberry trees for silkworms, live-oak, cedar, and fir for shipping; and that on the banks of the Potowmac, there were trees large enough for masts, that produced a species of wild hemp, for cordage, pines which yielded tar, and a vast quantity of iron ore; besides lead, antimony, and other minerals, and several kinds of colored earths; that in the woods were found various balsams, with other medical drugs, with an immense quantity of myrtle berries for wax; that the forests and rivers harbored beavers, otters, foxes, and deer, whose skins were valuable articles of commerce; that sturgeon might be taken in the greatest plenty, in five noble rivers; and that without the bay to the northward, was an excellent fishing bank for cod of the best quality; that the soil was favorable to the cultivation of vines, *sugar canes, oranges, lemons, almonds*, and rice; that the winters were so mild, that cattle could get their food abroad, and the swine could be fattened on wild fruits; that the Indian corn yielded a most luxuriant harvest; and in a word, that it was "one of the goodliest countries," promising as rich entrails as any kingdom of the earth, to which the sun is so near a neighbor."—*Purchas.*

At the close of Sir Thomas Dale's administration, the colony had so much stability, that the grants of 100 acres, which before had been made to every new settler, were reduced to 50 acres—

—"and this alteration had its rise in the opinion, that the country being likely to flourish, and the difficulties of making settlements consequently having become proportionably less, it was no longer necessary or politic to hold out such strong inducements to emigration."—*Burk, p.* 177.

The following gives some idea of the money value of lands at this time. Besides the general mode above stated of granting lands to settlers, there were two others. The first mode, probably, was the origin of the "aristocracy" of Virginia.

"When any person had conferred a benefit, or done service to the company or colony, they would bestow such appropriation of land upon him. However, to prevent excess in this particular, they are restrained by his majesty's letters patent, not to exceed twenty great shares, or two thousand acres in any one of these grants. The other was called the adventure of the purse. Every person, who paid twelve pounds ten shillings into the company's treasury, having thereby a title to an hundred acres of land, any where in Virginia, that had not been before granted to, or possessed by others."—*Hist. of Va., p.* 178.

The habits of the colonists had now become industrious, and of course, there was no more scarcity.

"Nay, whereas they had formerly been constrained to buy from the Indians yearly, which exposed them to much scorn and difficulty. The case was so much altered under his management, that the Indians sometimes applied to the English, and would sell the very skins from their shoulders for corn. And to some of their petty kings, Sir Thomas lent four or five hundred bushels; for re-payment whereof next year, he took a mortgage of their whole countries."—*Stith, p.* 140.

"The attention of [The London, or Proprietary] Company was directed with equal care to almost every subject of political economy; and as the country as yet held out no prospects of sudden wealth in the working of mines, agriculture was naturally resorted to as the means of trade and subsistence. Tobacco had in some degree grown into notice by the whim of the colonists, and the fashion of the times, unaided by the patronage, and indeed, in defiance of the repeated injunctions of the company. But a strange taste for this nauseous plant was rapidly gaining ground in Europe; and the king, notwithstanding his unaffected antipathy to it, tempted by the prospect of revenue, at length permitted it to be entered in 1614, as a regular article of trade. The colonists had learned the art of planting corn, together with the use of this valuable production, from the Indians. Vineyards were attempted; and experienced vine-dressers sent over for this purpose. The culture of silkworms was recommended with a like anxiety; whilst anniseed, flax, hemp, wheat, and barley, with various other productions, formed a large and judicious list for future essay and experiment. Colonies will, for a considerable time at least, reflect the manners and pursuits of the parent state. During the last years of the reign of James, a considerable taste for agricultural inquiry prevailed; and numerous treatises were published on the subject. The company sent over several of these tracts, for the use of the colony. It is not surprizing, that at this time, a rage for speculative farming prevailed in the colony.

"The commerce of Virginia, from the nature of things, was for a long time of little value. Before the year 1614, she had no staple. But once, that she was legalized as a a fair trader, and the industry of her citizens was excited by the prospect of wealth and the security of freedom, her advances were unparalleled and almost miraculous. In the year 1620, her tobacco was more than sufficient for the English market, and the continent was resorted to, as a vent for the superfluity. —*Hist. of Va., vol.* 1, *p.* 305.

Tobacco was not only the staple crop, but it soon became, and long continued, the greater part of the legal and current money of Virginia. Payments and fines fixed by law were generally specified in tobacco—and that kind of money was not entirely displaced until the revolutionary war. Even after tobacco was no longer a legal tender in payment, habit and convenience continued to make tobacco notes, (or the certificates of hogsheads of tobacco, and their weights, being deposited in the public inspection houses,) a common currency. It is not 40 years ago since a tobacco note passed from hand to hand for the sum that the hogshead would sell for, and the possession of the note was the evidence of ownership. There was much convenience in this before other paper money had been authorized by law—and such a paper currency had the rare advantage of being the representative of *real value*. But this conversion of tobacco to current money, and at a fixed legal rate, doubtless aided in this respect the universal tendency of all legal inspections of the qualities of commodities—that is, of *deteriorating* the quality, and of course, ultimately, the market price. The legal inspection of tobacco remains to this day a prominent feature of the absurd and general inspection system: and the only redeeming merit of this is, that the certificates of the inspectors, as to the quality of the tobacco, are universally and totally disregarded as evidences of value.

I proceed to give some of the early rates of value as estimated in tobacco, and fixed by the governors' proclamations.

"During the administration of Captain Argall, tobacco was fixed at three shillings the pound. In 1623, Canary, Malaga, Alicant, Tent, Muskadel, and Bastard wines, were rated at six shillings in specie, and sack, nine shillings the gallon payable in tobacco. Sherry, and Aquavitæ, at four shillings, or four and six-pence in tobacco. Wine vinegar at three shillings, or four shillings and six-pence in tobacco. Cider and beer vinegar at two shillings, or three shillings in tobacco. Loaf sugar, one shilling and eight-pence per pound, or two shillings and six-pence in tobacco. Butter and cheese eight-pence per pound, or one shilling in tobacco. Newfoundland fish per cwt. fifteen shillings, or one pound four shillings in tobacco. Canada fish, two pounds, or three pounds ten shillings in tobacco. English meal sold at ten shillings the bushel, and Indian corn at eight."—*Hist. of Va., vol.* 1. *p.* 307.

In 1697, an improvement was made in the mode of curing tobacco, which was deemed of enough importance to be stated in history. [*Stith, p.* 147.] Previously, it had been cured in heaps. Mr. Lambert discovered that it cured better hung on lines, or on sticks, as in now customary.

"One hundred dissolute persons, at the express command of his majesty, delivered by his marshal, were sent over as servants, [in 1619,] much to the dissatisfaction and inconvenience of the company, who were obliged instantly, at the positive urgency of the king, to hire ships at an advanced premium.

"At the instance and advice of the treasurer, one hundred virgins were sent over as wives, for the purpose of fixing to the soil, the roving and inconstant spirits of the colonists."—*Hist. of Va., vol.* 1, *p.* 266.

"Such of these maids as were married to the public farmers, were to be transported at the company's expense, but if they were married to others, that then those who took them to wife, should repay the company their charges of transportation."—*Stith, p.* 166.

"The arbitrary conduct of the king, with regard to the persons ordered for transportation, was followed by one equally flagrant and unjust, respecting tobacco, contrary to the plain and express words of their charter, which exempted them from all custom and subsidy for twenty one years, excepting only five per cent. upon all such goods, &c. "as should be imported into England," &c. The Spanish tobacco, which generally brought eighteen shillings the pound, and tobacco of Virginia, which was sold at three, were fixed by the financial logic of the farmers of the customs, at an average ratio of ten shillings the pound; while with a consequence perfectly consistent with the premises, a duty of six-pence the pound was demanded on the whole." —*vol.* 1, *p.* 207.

"Tobacco had become the staple of the country; and with this article the colonists not only stocked the English market, but had opened a trade for it with Holland, and established ware-houses in Middleburg and Flushing.

"The king, notwithstanding he professed on all occasions the most marked dislike and aversion to this commodity, and had even labored to write it into disrepute,* did not see with indifference the diversion of a part of his revenue into foreign states, by the trade of the colonists. In vain the petition of the colonists, and the remonstrance of the company, attempted to soften or remove the obduracy of the monarch. Their deputies had to encounter the stern denial of justice from the privy council, in addition to the frowns and insolence of office. They were ordered to bring all their tobacco into England, in despite of their privileges as Englishmen, and the plain letter of their charter."—*vol.* 1, *p.* 209.

"This year (1620) was remarkable for the introduction of negro slaves into the colony—an evil, than which, none can be conceived more portentous and afflicting. A Dutch ship bound homeward from the coast of Guinea, sold twenty of this wretched race to the colonists."—*vol.* 1, *p.* 210.

In 1621, various things most needed by the colony were subscribed, or advanced on loan, by individuals of the company in England, to be sold in Virginia on certain terms, for re-payment. The most remarkable venture enrolled, consisted of—

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*See at page 11, vol. ii. of the Farmers' Register some amusing passages ext acted from King James' *Counterblaste to Tobacco*.

-an hundred more maids, to make wives; and sixty were accordingly sent, young, handsome, and well recommended to the company, for their virtuous education and demeanor.

"With them was sent over, the several recommendations and testimonials of their behavior, that the purchasers might thence be enabled to judge how to choose. The price of these wives was stated at an hundred pounds of tobacco, and afterwards advanced to one hundred and fifty, and proportionably more, if any of them should happen to die; so that the adventurers might be refunded their original charge: And it was also ordered, that this debt of wives, should have the precedency of all others, and be first recoverable.

"And it was strictly enjoined, that they should be used well, and not married to servants, but to such free men and tenants, as could handsomely support them; that, by their good fortune, multitude, of others might be allured to come over, on the prospect of advantageous matches. And the company likewise declared their intention, that, for the encouragement of settled families, and securing a posterity, they would prefer and make consignments for married men, before single persons: and that as many boys should be sent as there were maids, to be apprentices to those who married them. They also granted adventurers, who subscribed to this roll, a ratable proportion of land, according to the number of maids sent, to be laid off together, and formed into a town, by the name of Maidstown."—*Stith, p.* 197.

In the same year, the instructions to the authorities, brought out by Governor Yeardly—

"pressed upon them the raising several useful commodities, as well as corn, wine, silk, and others heretofore frequently mentioned; as also making oil of walnuts, employing their apothecaries in distillation, and searching the country for minerals, dyes, gums, drugs, and the like: and they ordered them, particularly by the king's advice and desire, to draw the people off from their excessive planting of tobacco. To that end, they were commanded to permit them, to make only an hundred pounds of tobacco ahead; and to take all possible care to improve that proportion in goodness, as much as might be, which would bring their commodity into request, and cause a more certain benefit to the planter."—*Hist. of Va., vol.* 1, *p* 226.

The letters of the governor and council in 1621, to the company, state, "that tobacco was stinted to 100 plants per head, nine leaves to a plant," for each individual cultivator.

Among the laws made by the assembly in 1624, were the following:

"That whosoever should absent himself from divine service any Sunday, without an allowable excuse, should forfeit a pound of tobacco, and that he who absented himself a month, should forfeit fifty pounds of tobacco: That there should be an uniformity in the church, as near as might be, both in substance and circumstance, to the canons of the church of England; and that all persons should yield a ready obedience to them, upon pain of censure: That the twenty-second of March (the day of the massacre) should be solemnized and kept holy; and that all other holidays should be observed, except when two fell together in the summer season, (the time of their working and crop,) when the first only was to be observed, by reason of their necessities and employment: That no minister should be absent from his cure above two months in the whole year, upon penalty of forfeiting half his salary; and whosoever was absent above four months, should forfeit his whole salary and his cure: That whosoever should disparage a minister, without sufficient proof to justify his reports, whereby the minds of his parishioners might be alienated from him, and his ministry prove less effectual, should not only pay five hundred pounds of tobacco, but should also ask the minister forgiveness publicly in the congregation: That no man should dispose of any of his tobacco before the minister was satisfied, upon forfeiture of double his part towards the salary; and that one man of every plantation should be appointed to collect the minister's salary, out of the first and best tobacco and corn."—*Hist. of Va. vol.* 1, *p.* 280.

"That, for the people's encouragement to plant a store of corn, the price should be left free, and every man might sell it as dear as he could: (for the governor and council did then, and long afterwards, set a rate yearly upon all commodities, with penalties upon those who exceeded it.) That there should be a public granary in each parish, to which every planter above 18 years of age, who had been in the country a year, and was alive at the crop, should contribute a barrel of corn, to be disposed of for the public uses of the parish, by the major part of the freemen; the remainder to be taken out by the owners yearly, on St. Thomas's day, and the new brought and put in its room: That three capable men of every parish, should be sworn to see that every man planted and tended corn sufficient for his family; and that those who neglected so to do, should be presented by the said three men, to the censure of the governor and council: That all trade with the Indians for corn, as well public as private, should be prohibited after the June following: That every freeman should fence in a quarter of an acre of ground, before the Whitsuntide next ensuing, for planting vines, herbs, roots, and the like, under the penalty of ten pounds of tobacco a man; but that no man, for his own family, should be obliged to fence more than an acre; and that whosoever had fenced a garden, and was ousted of the land, should be paid for it by the owner of the soil; and that they should also plant mulberry trees."—*vol.* 1, *p.* 283.

It seems that the ladies of former days were at least as much given to coquetry as their fair descendants —but that they did not escape as easily as now from all ill consequences of their offence. The peculiar circumstances then existing—the number and variety of suitors, and the strong proofs of their love, offered by the readiness of each to exchange his whole market crop for a portionless bride—served to increase this natural propensity of the fair sex, and ought to have made the offence more pardonable. But the assembly took the matter in a more serious light, as by their enactment of 1620—

"the governor was obliged, soon after, to issue a proclamation, forbidding women to contract themselves to two several men at one time. For women being yet scarce, and much in request, this offence was become very common; whereby great disquiet arose between parties, and no small trouble to the government. It was therefore ordered, that every minister should give notice in his church, that what man or woman soever should use any word or speech, tending to a contract of marriage, to two several persons at one time, although not precise and legal, yet so as might entangle or breed scruple in their consciences, should, for such their offence, *either undergo corporal correction*, or be punished by fine, or otherwise, according to the quality of the person so offending."— *Hist. of Va., vol.* 1, *p.* 85.

We have certainly improved greatly in this respect in Virginia. This amiable weakness of the best of nature's works, is no longer threatened by *law* with "corporal correction"—nor have we given the least countenance to the even baser modern fashion of the more northern states, of jilted lovers seeking alleviation of their woes, by bringing suits for pecuniary damages.

In 1629, it was required by the government that "every laborer should tend two acres of corn, or forfeit all his tobacco."

The quantity of tobacco which each person had been permitted to raise annually, was increased to "three thousand plants for men, and two thousand for women and children. This was afterwards restricted to two thousand, nine leaves on a plant, and no slips or seconds were permitted to be planted."

But no degree of restriction on the amount of cultivation, had served its intended object of improving the quality and the price of tobacco: and instead of such partial restrictions, it was now proposed that the extraordinary measure should be adopted of an entire cessation of the raising of tobacco, for a certain limited time. It increased the strangeness of the matter, that the people were more anxious to be thus restrained, than the government to impose the restriction. But now, to make the cessation effectual, it required the co-operation of the younger colonies of Maryland and Carolina.

"Meanwhile the depreciation continued to such an extent, that the planters were scarcely able to clothe their families by the sale of their crops. An answer arrived at length from the chancellor of Maryland, enclosing the lieutenant governor's proclamation, enjoining a total cessation for a given time, to all the subjects of that proprietary.

"These letters accompanied with his own correspondence, the governor laid before the house; and the question being taken whether this was a sufficient confirmation, it was decided in the affirmative. By this decision an act made during the former session restricting the planting of tobacco from the first of February, 1666, to the first of February, 1667, was declared to be in force; and the governor was directed to signify the same by proclamation to the several counties."—*Hist. of Virginia, p.* 193, *Vol.* 2.

"But the benefits to be reaped from these projects, even though successful, were remote; and the necessities of the colony were immediate and pressing. Doubts began to be entertained of the good faith of Maryland in observing the cessation; and they were haunted with apprehensions lest, after tying up the industry of the colonists, by prohibiting the culture of their only staple, the project should be defeated by the avarice of a people who would grow rich by their ruin."—*Hist. of Va. p.* 192, *vol.* 2.

But however small the benefit found in this trial of the cessation of the culture of tobacco, its repetition continued to be urged as a favorite remedy for low prices. In 1681, the council wrote to Lord Culpeper, the governor then in England, respecting sundry grievances of the colony, and "entreated that his influence might be used to procure a cessation in planting tobacco."

"Meanwhile the rapid depreciation of tobacco, added to the operation of the commercial restraints imposed by parliament, had produced a general dissatisfaction among the people. They had vainly attempted to apply a remedy to the former evil, by procuring the co-operation of Carolina and Maryland. This plan had failed through the jealousy or avarice of those governments; and they were left to struggle with difficulties, which were daily accumulating, and of which they could see no prospect of termination. They could not even hope for the sanction of their own government, which formerly approved a cessation. Other maxims were now entertained by the executive, more suited to the views of the court; and the inquiry was not, what would be beneficial to the country, but how will it affect his majesty's revenue?"—*Hist. of Va. p.* 228, *vol.* 2.

The popular desire for the *cessation*, added to the pressure of some other real (but less regarded) oppressive measures of government, produced much discontent, and finally broke out in the insurrection.

"The people of several counties, having lost all hope of a cessation by the dissolution of the assembly, ran together tumultuously, and proceeded to the entire destruction of the tobacco plants in the beds, before they were transplanted. Their proceedings were so timed, that the season was too far advanced to make good the loss by seed; and as the culture of sweet scented tobacco was almost exclusively confined to Virginia, they directed their efforts peculiarly to the destruction of this sort."—*Hist. of Va. p.* 233, *vol.* 2.

"The governor now left to the exercise of functions purely executive, proceeded to a severe inquiry into the late insurrection. The king had instructed him that the plant cutters and their instigators, came properly within the purview of the statutes relating to treason, and had commanded, that the rioters should be proceeded against by the attorney-general, and punished with the utmost severity."—*Hist, of Va. p.* 240, *vol.* 2.

The following is the earliest notice of cotton crops having been recommended.

"Sir Edmund Andross was a great encourager of manufactures. In his time fulling mills were set up by act of assembly. He also gave particular marks of his favor towards the propagating of cotton, which since his time has been much neglected."—*Beverley*, § 142, *p.* 90.

The following extract will give some interesting information on the value of agricultural products, and other commodities.

"The price of corn and other articles of food, during this epoch, varied considerably, according to circumstances. Corn, at a medium, sold from ten to eighteen shillings the barrel. A bull was worth seven hundred pounds of tobacco, or eight pounds fifteen shillings. Poultry would naturally command a greater price, from the delays and difficulty of procuring a stock from Europe, and the inconvenience of their multiplication amongst cultivators, whose whole attention was almost wholly engrossed in clearing the forest for cultivation. A goose, during the administration of Hervey, cost twenty shillings, and we should conclude that other fowls were in proportion.

"The rates of ordinaries, established in 1666, by Sir William Berkeley, will throw more light on this head than is to be collected from the rates of separate commodities. As these rates were stated to have been fixed, in order to prevent the extortion of keepers of taverns and eating houses, we should conclude they are lower than the previous charges.

A meal for a master,	15lbs.	tobacco.
Ditto for a servant, - -	10	do
Lodging for either (per night)	5	do
Spanish wines, per gallon,	10s. or 100	do
French do	8s. or 80	do
Brandy, English spirits, or Virginia dram,	16s. or 160	do
Rum, - - -	10s. or 100	do
Beer, - - -	4s. or 40	do
Cyder or perry, - -	2s6 or 25	do

These two last are stated to be rated proportionally higher, in order to encourage the produce of the country.

"From the circumstances of the colony, an horse must have been an animal at once rare and valuable In the year fifty-six the assembly ordered two thousand five hundred pounds of tobacco to be paid to John Page, for a horse lost in the expedition against the Rechahecrians. The complaint of Page, and the wording of the order, show, that this sum was not thought equal to that which the horse might have commanded. If we estimate the tobacco at the market price only six years after, it will amount to an hundred pounds; a prodigious price, if we consider the rates in Europe during this period. In the same year, on the petition of Richard Nicholas, it was ordered, "that sixteen hundred pounds of tobacco be paid him, for the charges and cost he had been at in recovering and finding a horse, which had been on the service in the same expedition." At the same time Richard Walker was ordered five hundred pounds of tobacco "for finding the horse of Henry Jupons, and four hundred more when he found that of Richard Eggleston."—*Appendix, Hist. of Va. p. xxxii. vol. 2.*

NOTE B. page 753.

The foregoing address was drawn up in the early part of January, to be delivered at the annual meeting of the Historical Society which was to have taken place on the 9th of February, but which was postponed from time to time, until March 2nd. When this task was undertaken, the attempt was about to be made through an Agricultural Convention, to obtain some legislative aid for the diffusion of agricultural knowledge; and the writer hoped, in this manner, to lend some feeble aid to that praise-worthy but fruitless effort. This intention, in some measure, directed the treatment of the subject, and induced the expression of hopes, which had not then been prostrated—as they were afterwards, and indeed before the meeting of the Society was finally held—by the total neglect of the whole subject, by the legislature of Virginia. When recommending objects for legislative encouragement, in aid of agricultural instruction, two principal, and and very important subjects were designedly omitted. The one was the circulation of agricultural periodical publications; the other, the establishment and support of agricultural societies. The recommendation of the first was forbidden by the writer's private interest being connected with what he might advocate—and the second, because much space would have been required to explain his views of what agricultural societies *ought to be*, and the objections to their *usual* procedure, and because the subject had been treated fully upon several previous occasions. See Farmers' Register, Vol. I. pp. 147, 291, and Vol. II. p. 257.

From the New England Farmer.

IRRIGATION.

Extract from a communication from JOHN W. LINCOLN, of Mass.

Having had some experience in this busines, I am disposed to offer myself as a witness, premising that no school boy is more amused by paddling in the water, than I am pleased with turning it about from place to place on my farm, knowing that I could in no other manner be so profitably employed; gratified with witnessing from time to time the superior growth of the grass, and anticipating the pleasure of seeing a heavy swath when it shall be cut.

My late father was in the practice of irrigating a portion of his land on the farm on which I was born, on which there are tracts which have, within my own knowledge, for nearly forty years annually produced large crops of hay, without the aid of any manure, except that derived from water. In the spring of 1820, on the decease of my father, that farm, now owned by my brother, was placed under my superintendence; and from that time to the present my attention has year by year been called to the subject of irrigation, and during that time I have known no year, however moist has been the season, in which I have not derived much benefit from the artificial use of water on my land. The farm on which I now reside came into my possession in 1820, previous to which time, a portion of it had been irrigated, but the works, from disuse, were much out of repair. It not being convenient for me to take it under my own immediate supervision, I rented it, as it has been rented for many years, on shares. I however at my own charge put the dam, the principal trench, and several of the smaller ones in repair, and endeavored to persuade my tenant, that it was much for his interest to make use of them. But whether he believed that our climate did not require this mode of improvement, that a kind Providence would supply all the moisture which was necessary for vegetation, or was unwilling to devote proper attention to this subject, I know not, it was much neglected. In 1829, my barn being then old, and much out of repair, I caused it to be pulled down, and another to be erected of a different form and greater capacity. When I showed the plan of the proposed structure to my tenant, he expressed much surprise that I should think of erecting so large a building, saying that all the produce of the farm would not half fill it. I told him that I was satisfied that the farm, if properly managed, was capable of filling it, and that if I continued in the enjoyment of health for a few years, that I should see the barn full. It was true that after the barn was erected, and the crops gathered, not half the barn was occupied: and it is also true, that after the last harvest there was very little spare room in my barn. On the first day of April, 1830, I took my farm into my own care, and I was obliged to purchase several tons of hay to support what stock was then there, until vegetation was so far advanced, as to enable them to obtain a living abroad. I have been gradually increasing my stock as I had more food to sustain them, and now keep more than twice the stock of 1830, and have now considerably more hay than can be necessary for their support, several tons of which I shall sell. And this change has been effected principally by irrigation. I say principally, because I have during that time purchased some manure, but I have also received for hay sold, nearly as much money as I have paid for manure; and perhaps something is to be attributed to a different mode of husbandry on lands not irrigated, but the improvement which has been increasing from year to year, is in a great degree owing to the use of water. I have strong reason to believe, that by employing the same means I shall be able to add greatly to the future crops of my farm. I have not heretofore derived so much advantage from this mode of improvement as might have been expected: my engagements have required me to be frequently absent from home, and consequently I have not been able to devote so much attention to the work as I desired.

It may be well to notice in this connexion, a fact which I am aware may be urged to discredit the favorable representations of this mode of improvement, that tracts of land even in England, in Pennsylvania, and elsewhere, were formerly irrigated, but the practice has now been abandoned. I believe in every case of failure the cause may be directly traced either to improper management, or to culpable neglect; such, I have already stated, was the case on my own farm, previous to my taking charge of this work in person, and such I have no doubt would be found to be the case in every other instance, could a proper inquiry be instituted. There is usually a strong indisposition to undertake or continue that which requires constant and daily attention: and this attention must be given to the work by those who intend to derive any advantage from it. Some will turn the water on to the land; their usual work is on another part of the farm; it is inconvenient for them to go to their ditches, and the water is allowed to run over their land, until the person who should have attended to it, happens to be that way, however long the time may have been; he afterwards perceives that a cold water grass is growing on his land, condems the water, instead of his own negligence, and the practice of irrigation is abandoned. There is no business that requires more attention than irrigation, from early in the spring until near the time of mowing the grass. If the water runs long on the same land without intermission, instead of being of benefit, it is working an injury. It is desirable that it should be changed each day, but should never be allowed to run more than two or three days on the same part of the land at any one time.

Having attempted to show that irrigation in our climate is *beneficial*, that good husbandry requires that that mode of improvement be adopted wherever opportunity is afforded, I shall now endeavor to controvert the position that "it is too expensive for our scale of husbandry." That "systematic irrigation," in conformity to the scientific rules, as laid down in the books, is expensive, I shall not deny. But if this expenditure was necessary to enable a farmer to make use of water, which, however, is not the case, the increased crops would soon reimburse the expense. From my own experience, I can say that I know of no mode by which hay can be obtained so cheaply as by the use of water. The greater portion of the land which I irrigate is interval, situated upon the margin of the Blackstone river, from which stream the water is taken. The ground is, as is usual with alluvial lands, highest near the stream, and descends towards the high bank, it also descends with the river. Near the high bank is a hollow, usually here called a slang, which extends the whole length of the interval, with branches diverging, and some of them extending across the interval. For the purpose of conveying the water to be distributed over the lower portions of the interval, it was necessary to cross several of these hollows, and as it would be necessary to pass over them with a team in the gathering the crops, I made two walls sufficiently wide for a cartway between them, filled the space with gravel, and made my ditch over the embankment. That the embarkment might not operate as a dam, a culvert was constructed under it, enable me to continue my trench drain without interruption, to carry off the surplus water. Where it is not desired to be at the expense of a stone culvert, a very cheap one may be constructed, by fastening four pieces of plank together, to serve as a trunk to convey the water of the drain. The weir or dam, and a part of the principal ditch for conveying the water on to the land, were constructed before the farm came into my possession, all the smaller ditches and trench drains have been made by me, in the following manner:—After having particularly examined the ground, by repeatedly passing over it, for the purpose of forming an opinion of the proper plan of laying out the work, I went on to the ground with my level, and with a man to assist me. I commenced the marking out the location for a ditch, as high up the main ditch as the water could be taken upon the land, and my assistant stuck into the earth small sticks, with which he had prepared himself, at short distances, and at such places as by the level I used would enable me to keep the ditch nearly or quite level, and in a direction as nearly at right angles with the main ditch, as the form of the land would admit, which was, however, frequently in a very serpentine course. Having in this manner marked out as many ditches as I supposed necessary, and at such distances as would enable me, as I then judged to water all the land in a short time, I with a plough and with a steady ox team turned a furrow each way to the centre, in a line indicated by the small sticks, and thus my ditch was formed. The sods may be used in levelling any inequality in the land or as I prefer, they may, with the dung-fork, be readily thrown into a cart, and deposited in the barn, or hog-yard, to be there converted into manure. If after turning the water into the ditch thus made, I find any slight inequality in the surface of the outside of the ditch which allows the water to escape before the ditch is entirely filled. I take sufficient earth from its bottom to level its bank, so that the water will trickle over the land the whole length of the ditch. When I first commenced this business, I left the panes between the ditches too large, as I found by observation that a portion of them did not obtain a supply of water: but this defect I have since remedied by making intermediate ditches. In all the slangs a trench drain should be constructed to conduct off the surplus water. As all stagnant water, if it remains long on the land, is prejudicial to vegetation, every hollow should have a drain attached to it, and to this thing too much attention cannot be paid. Before making the drains it is desirable that a careful examination should be had, to determine whether the same trench that is used as a drain for one part of the land, may not be used to conduct the water on to another portion of the land on a lower level; from this I have derived much advantage. As the quantity of interval land which I irrigate is so extensive, being estimated at more than thirty acres, that I could not, if I wished, suitably water it all at one time, I have therefore in the main ditches several hatches or flumes to enable me to turn the water at pleasure on such part as I may wish. I have found it convenient to place at the mouth of each of my small ditches, a small flume made by taking four pieces of plank, and fastening them together by large nails, the ends being left open, and the top plank about four inches shorter than the sides or bottom, the ends of the plank to be even with each other at one end, and a board to be fitted in as a gate and kept in its place by cleats nailed on the sides of the trunk at the other end. I have usually divided my watering into parts, and when I can attend to it, I change the water each other day, (each day would be better,) so that the water will be on the land two days, and off six days, or I can shut it off entirely at pleasure. By the aid of the small flumes above mentioned, I am able to turn the water from one part of my interval on to any other part which I wish to irrigate, with very little loss of time, beyond that of passing to and from the land.

PROCEEDINGS OF THE PETERSBURG RAIL ROAD COMPANY.

At the Annual Meeting of the Stockholders of the Petersburg Rail Road Company, held at the Bollingbrook Hotel in the town of Petersburg, on Monday, March 7th 1836—

John D. Townes Esq., Mayor, was appointed Chairman, and Samuel Mordecai, Secretary.

It being ascertained that of 6025 shares which constitute the stock of the company, 5561 were present, the meeting proceeded to business.

Charles F. Osborne Esq., President of the company, presented a report of its operations and condition, accompanied with various tabular statements, and also a report made to him by H. D. Bird Esq., Engineer—all which were accepted.

The following resolutions were adopted unanimously.

Resolved, That the President and Directors be and they are hereby authorized, to borrow any sum of money, not exceeding sixty thousand dollars, to refund the amount hitherto expended, or which may hereafter be required for the purpose of extending and perfecting their arrangements, and for procuring an increased number of locomotive engines, coaches, and cars, for the use of the company.

Resolved, That the President and Directors be and they are hereby empowered and authorized, to arrange with the President and Directors of the Greensville and Roanoke Rail Road Company, for the general transportation on their road by this company, provided such an arrangement can be made on fair and equitable terms, and advantageous to the interests of both companies.

Resolved, That this meeting approve of the application made to the present legislature of this state for amendments to the charter of this company, and should the legislature grant the same, in conformity with the petition of the Board of Directors, this meeting hereby accept and confirm said amendments.

An election of President and Directors for the ensuing year was then held, whereupon Charles F. Osborne Esq., was unanimously re-elected President, and Robert Bolling, Joseph Bragg and Hartwell P. Heath Esq., were re-elected Directors.

Samuel Mordecai Esq., was re-appointed a Director on the part of the Commonwealth, and Thomas N. Lee Esq., was appointed on same behalf, in place of James S. Brander Esq., resigned.

The following resolutions were then unanimously adopted.

Resolved, That the thanks of the Stockholders in the Petersburg Rail Road Company be presented to C. F. Osborne Esq., President of the company, for the able and efficient manner in which he has discharged the duties which devolved on him, and which has tended to place the company in its present prosperous condition.

Resolved, That the thanks of the Stockholders be also presented to Henry D. Bird Esq., for his unremitted attention to, and skilful management of the department of the business of the company, which has been under his superintendence.

Resolved, That the report of the President and Directors be published.

And the meeting then adjourned.

JOHN D. TOWNES, *Chairman.*

REPORT OF THE DIRECTORS.

The Board of Directors under the obligations imposed by the charter and by-laws, and their own sense of duty respectfully report.

Immediately after your last meeting, and the present organization of this Board, they proceeded to consider what was meet and proper to be done, under your resolution, giving authority to negotiate farther loans, or create stock, in order that the exigences of the company might be provided for in the manner most conducive to your best interest. It was soon ascertained that the amount required, could not be borrowed upon favorable terms. The stock at that time being below par, and the debts of the company not inconsiderable, the board deemed it advisable under all the circumstances, to consent to the creation of new stock to the amount of $85,000, provided they could make an arrangement to do so at par. This was effected through the liberality of the Messrs. Biddle of Philadelphia: and the consequence has been a progressive improvement in the value of the stock, and the affairs of the company, from that period to the present moment. Simultaneous with this arrangement, public notice was given to the holders of certificates of dividend, of your resolution of the 2d of last March, conferring on them the privilege of converting their warrants into stock—and to those stockholders whose dividends did not amount to the value of a certificate, of the readiness of the company to discharge the same in cash. Of this debt $29,500 was converted, and $4144.86 with interest to 1st May last, was paid, leaving unpaid, only, the dividend certificate held by the state, and due in 1842 for $16,000—and of the dividends of 1834 yet unclaimed $370. All of which are more fully exhibited in the tabular statements accompanying this report. So soon as these negotiations were complete, and made public, all of the loan bonds issued in 1833 and made convertible into stock at the will of the holder, were (with a single exception amounting to $3000) converted into stock, and thus has our capital been increased from $400,000 to $602,500 its present amount. These results, proceeding from resolutions adopted and recommended by you at your previous meeting, and carried into effect under the duties thereby imposed, render further explanations respecting them now unnecessary.

The income of the company this present year is $104,269 49: last year it was $80,949 65 being an increase of $23,310 84, which is 29 per cent. more the present, than the past year. Thus showing an income, whilst we are yet in our infancy, surpassing the most sanguine expectations of the friends of the road: nor do the board believe this income will ever be diminished. On the contrary, they are convinced, from all the calculations they can make, that the progressive additions to it, will be greater hereafter than heretofore. Born as the road was, in trouble, frowned upon at its birth, and never yet caressed, the board are nevertheless confident it has now obtained such vitality and strength, that it will more than realize the ardent hopes of its friends, baffling at all times, every scheme or machination which has been, or may hereafter be projected to its prejudice. On the north we have the Richmond and Fredericksburg Rail Road rapidly completing. On the south within the short space of a year, we have grafted on our road the Greensville and Roanoke Rail Road; and proposals will soon be submitted for a bridge across the Roanoke at Gaston, connecting that improvement with the Raleigh and Gaston Rail Road—and satisfactory assurances are given us that before the present year rolls away the connexion will be complete, and part of the road on the other side of the Roanoke so far made, that it may be used for travel and transportation.

With these feeders on the north and south and at no distant day a connexion with the Yadkin country, (perhaps the finest in the south,) either at Raleigh or at Oxford, we are insured a continued and increased value to our investment: nor is it too much to anticipate, that the period is almost at hand when from the profit on travel alone, we shall declare such dividends to our stockholders, as will amply satisfy them, and consequently have it in our power to reduce the rates of transportation of produce, to the mere expense of its receipt and delivery. These results we shall more than attain, should our western fellow citizens mature their contemplated improvement; and being attained, it is for you to determine its action upon the commercial prosperity of our town.

Until the past year, the resourses of the company were very limited—the original capital was found insufficient, and a large debt was consequently contracted, and, besides, the payment of all the current debts which it was possible to postpone, were deferred,—all these have been paid with all the interest which had accrued upon them. Independent of this, almost all the materials of repair are anticipated; and instead now of being a year in arrears, we are twelve months in advance, in these respects. We have likewise discharged some of the old demands for land damages; and all the known litigated claims, with one or two exceptions, have either been compromised, or otherwise disposed of, in a satisfactory manner.

It is our duty also to inform you that we have purchased another steamboat, at the cost of $7.500, to meet the wants of the trade on the lower Roanoke and during the past year have rebuilt the tavern at Blakely, in a strong substantial and handsome manner. The cost of this establishment will be $7.600, according to contract. It will thus be apparent to you, how the funds of the company have been disposed of, when these items are added to the ordinary expenses.

You will perceive from the accounts now before you, that $41.935.19, has been this year expended beyond the actual capital of the company. This amount properly belongs to the fund to be divided among the stockholders, and it may be expedient perhaps to resort to a temporary loan to refund the amount already abstracted from this fund, as well as what may be hereafter required for similar purposes. The board, with all deference, would recommend this course being pursued, in preference to a further increase of capital: being fully persuaded, that from the profits of the company, they can derive good and sufficient dividends, and pay off gradually any debt which is now due, or which it may be hereafter necessary to contract. You will observe from the statements on your table, that our income for the year past more than meet all the charges against transportation, (we include here all of our expenses,) besides paying a dividend of ten per cent to the stockholders.

The expences the ensuing year will, according to the estimate before you, amount to $45,000. These it is believed cannot be farther diminished. Every reduction has been made, and all the economy introduced, which in our opinion circumstances permit.

The Directors have pleasure in stating, that the amount paid for losses the present year, has been comparatively small. Last year transportation was debited on this account with $5941,22; this year with $1174,12, and this too almost entirely incurred, by the burning of a car loaded with dry goods in March last. We have had no similar accident since—have burned no cotton—and trust and believe, have reduced the chances of these calamities materially by our present arrangements.

We submit to you a detailed report respecting our road, locomotives, &c. from our Engineer, Mr. H. D. Bird; and will not omit this opportunity to bring to your especial notice, the merits of this invaluable agent—the talents, energy and zeal displayed by him on every occasion, and in every trust, is deserving of all praise: nor can you too highly appreciate his devotion and zeal to your interest, and the valuable services of others in your employ.

It is confidently believed that the condition of the road is much improved. Every piece of decayed timber is carefully removed and every precaution used to avoid accidents of all kinds. Our locomotives and cars are all in good order. Our coaches need improvement, and these will be attended to, in the course of the present summer.

You will observe from the statement, we have now 7 locomotives and 100 cars, having added the past season 2 locomotives and 35 cars to our stock. These we should increase the present year, particularly if this company undertakes the transportation on the Greensville and Roanoke Rail Road. And the board would recommend to the stockholders to authorize the Directors, or some committee, to make for this purpose an arrangement with that company, being satisfied, such an understanding would promote the interest of the stockholders in each company. A similar arrangement with the Raleigh and Gaston Rail Road Company would redound to the prosperity of all concerned, and it is submitted to you, whether or not it is now advisable to give such authority to the board at your present meeting, or defer its consideration to another year.

We have applied to the present legislature through our representative J. T. Brown Esq. for an amendment to our present charter, should you concur in its provisions. A copy of the proposed amendment is before you and we are led to believe it will pass.* It asks of the legislature, as you will perceive, to put our stock on the same grade, as regards our profits and rates, with those of the Richmond and Fredericksburg road, giving a more fixed and permanent regulation to its character than the present complex plan of our charter admits—in other words fixing our maximum rate of dividend at 15 per cent. instead of a return of capital and 6 per cent. thereafter. The advantage resulting from this arrangement will be, that the actual value of the stock will always speak for itself, instead of requiring abstruse calculations to ascertain it. Moreover this alteration will furnish additional inducements to the stockholders, especially, those resident at the north, to embark in other improvements calculated to increase the present transportation on our road. It was these considerations which induced the board to make this application, and we hope they meet your approval.

The Board have likewise applied to Congress through our representative John Y. Mason Esq. for a return of duties paid by the company on car wheels with rolled tires, locomotives, &c. Should this reasonable petition be granted, we shall receive from the treasury about $16,000. We are induced to hope the application may be successful; but although right and proper in every point of view, we dare not be sanguine in its favorable result.

The Board deem it not irrelevant to express the hope that public attention will soon be directed to the improvement of Nottoway river—an improvement in the opinion of engineers easily made, requiring but moderate means to effect, and promising great advantages. But these advantages being essential to the prosperity of the counties of Lunenburg and Nottoway, we may no doubt confidently rely on the public spirit of their citizens accomplishing this important end, without much, if any aid from our community. It should be regarded by us however as one of the legitimate avenues of our trade, and consequently deserving especial consideration.

The Board have caused to be laid on your table full and distinct accounts of all the affairs of the company—they submit them for your examination, and feel entirely confident, the more you investigate them, the more will you appreciate your investment.

By order of the Board of Directors,

CHARLES F. OSBORNE, *Prest.*

Transportation on the Petersburg Rail Road.

	1834.	Total.	1835.	Total.
February,	$3.671 86		$4,532 14	
March,	5,330 06		6,458 01	
April,	7,033 09		9,622 06	
May,	7.955 29		8,762 57	
June,	6,472 97		9,188 43	
July,	4,951 36		9.249 17	
August,,	5,692 87		8,197 32	
September,	5,775 42		8,443 46	
October,	7,917 43		8,109 12	
November,	8,302 98		7,663 96	
December,	7,566 73		6,714 21	
January, 1835,	5,279 59	$75,949 65	5,964 50	$92,304 90
Transportation of the Mail,		5,000 00		10,000 00
Storage,				96 83
Nett profits from Steamboats,				1,258 76
		$80,949 65		$104,260 49

Losses by fire and otherwise,	1834,	$5,041
Do do	1835,	1,174

* The amendment asked for has since been enacted by the legislature.—Ed.

Statement of the Affairs of the Petersburg Rail Road Company, Feb. 1, 1836.

Road, Bridges, Depots, &c. to 1835,	$506,391 68	
Depots added and improved in 1835,	3,807 61	
Repairs to Road, Bridges, &c. 1835,	7,889 53	
Land damages in old claim,	540 00	
Engines, Cars, &c. to 1835,	61,000 00	
Do in 1835,	40,970 10	
Steamboats and Lighters (doubled in 1835,)	15,943 85	
Hotel at Blakely rebuilt of brick,	10.224 84	
Mules and Horses,	1,091 22	
Wood and Coal, $1,266 97. Corn and Bacon, $696 49,	1,963 26	
Petty charges,	307 86	
Interest,	80 83	
Profit and Loss,	881 08	
Debts due to the Company, and cash in Agents' hands,	9,403 22	
Cash,	3,739 09	
Stock, old, $400,000. New $202,500,		602,500 00
Loan Bonds $3,000. Bills, &c., Custom House Bonds, $2,404 35,		5,404 35
Debts due by the Company,		9,537 14
Dividends unpaid,		25,800 00
Transportation—nett since 1st November, 1835,		20,472 97
Iron,		519 71
	$664,234 17	$664,234 17

Comparative Statement of the affairs of the Petersburg Rail Road Company, 1st February, 1835 and 1836.

	1st. Feb. 1835	1st. Feb. 183 .	Balances. Dr.	Cr.
Capital Stock,	$400,000 00	$602,500 00	*A* 202,500 00	
Loan Bonds,	100,000 00	3,000 00		97,000 00
Notes unpaid,	32,076 08	336 94		31,739 14
Custom House Bonds,	1,540 25	2,067 41	527 16	
Dividends unpaid,	40,000 00	*B* 25,800 00		14,200 00
Due to individuals,	11,710 10	9,537 14		2,172 96
Due by do	3,580 99	9,403 22		5,822 23
Iron,	418 91	519 71	100 80	
Cost of Road, Engines, Cars, Depots, &c.	577,080 96	*C* 620,638 82		*D* 43,557 86
Steamboats and Lighters,	7,697 13	*C* 15,943 85		*E* 8,246 72
Blakely Hotel,	4,971 32	*C* 10,224 84		*F* 5,253 52
Horses and mules,	120 00	1,091 22		971 22
Fuel and provisions on hand,		1,963 26		1,963 26
Surplus undivided,	8,636 29	19,203 20	10,566 91	
Cash on hand,	971 13	3,739 09		2,767 96
			$213,694 87	$213,694 87

A { In this sum of $202,500 is embraced loan bonds converted, $97,000
Dividend do do 20,500
New stock created 85,000

B Of this sum of $25,800 there is due to the state in 1842 $16,000
C Chargeable to capital.
D Of this sum, $28,640 expended in new engines and cars.
E A new steamboat and four lighters added.
F Hotel rebuilt of brick.

CONDENSED VIEW OF THE RECEIPTS AND PAYMENTS, YEAR ENDING 31ST JANUARY 1836.

Amounts of bonds, &c. converted into stock	202,560 00	
received for transportation (in 1834 $30,949 65)	164,200 49	
do from other sources	627 96	
Amount of out standing debts liquidated		210,926 91
of dividend 1st May 1835		19,880 00
of do 1st November 1835		30,125 00
of interest on pre-existing debt		3,257 30
of losses incurred in 1834 and paid this year		4,295 25
of charges on transportation and other disbursements		36,136 03
of cash in hand		2,767 96
	$367,388 45	$367,388 45

ON THE SCHEMES FOR RAIL ROADS IN NORTH CAROLINA.

To the Editor of the Farmers' Register.

Raleigh, (N. C.)
March 12th, 1836.

It is to be regretted that your correspondent "G. L. C." observes so little ceremony in planning some rail roads, and dealing damnation to others. He seems to sit at his desk, with an open map before him, intersecting every state with projected roads, uniting the most distant towns with lead marks. Regardless of the feelings of those who have long and zealously labored to promote a favorite scheme, he dashes all their cherished hopes, by one fatal stroke of his pencil, and raises a rival enterprise to crush the first. I think, Mr. Editor, it requires accurate knowledge of the topographical features of a country, deep and mature reflection on the interests, commercial and agricultural, of that country, and a freedom from all prejudice to project rail roads judiciously. Now, your correspondent has embraced in his letter such a large district of country, that there is ground to suppose he could not have bestowed that consideration on all the projects suggested, which could constitute him an adviser to be implicitly followed. In one short communication, he settles the whole system of internal improvement for Virginia, North Carolina, South Carolina, Tennessee, and Kentucky, not omitting some slight allusions to Maryland, Pennsylvania, New Jersey, and New York. It is, in truth, a letter *de omnibus rebus et quibusdam aliis;* for, not content with so extensive a field, there are sundry other topics discussed in it.

The chief objection I have to your correspondent, and the foundation of every other, is, that by taking too large a field he necessarily advocates or condemns unjustly. It is as evident as possible, that he might, without disadvantage, inform himself more fully about the roads coming to the Roanoke. It is very gratifying to a generous mind, to yield to conviction. But really I must ask for some reason, why works, which so many are interested in, and for which so much has been done, should be abandoned, because they are opposed to other works which your correspondent prefers. What magic is there in the name of Weldon, that it should be constituted the toll-gate of North Carolina?—and nothing permitted to pass the Roanoke elsewhere? Capitalists, merchants, farmers, the people, have decided against "G. L. C." Nearly six hundred thousand dollars have already been obtained for the Raleigh and Gaston Rail Road, and the small remainder of the capital stock will soon be made up. This is proof that all do not think Weldon the only place for a rail road to cross Roanoke. Your correspondent is very indignant at what he calls an "error" of "Raleigh." The error is this—(quoted from an article signed "Raleigh," in the Raleigh Register,) "the Gaston road will intercept all the trade from the west, and the greater part of the products of east North Carolina will be shipped from its coast." I suppose one of the "facts" which will be brought to prove this an error, is the fact mentioned in the same article, of the number of vessels which sailed out of one of the inlets in November last. Transportation by water is cheaper than transportation by rail road; and it is no error to suppose that the construction of rail roads will not put a stop to shipment by vessels which ply on our coast. Vessels of the largest size cannot come into the ports of North Carolina. Is it therefore absurd to say, that vessels of a less size will bear the products of the eastern part of the state to other parts of the union, or to the West Indies? The writer in the Raleigh Register was right. The Raleigh and Gaston Rail Road will be supported by the west; and if the citizens of Wilmington are mad enough to run a road to Halifax, they will find, when it is too late, that, cut off from the west, and weakened from the east by the coast trade, the receipts of the road will not keep it in repair. The Wilmington people could not do better than to make their road to Raleigh.

Mr. Editor, it is a hard task to arouse people to a spirit of internal improvement—but, when aroused, it is a still more difficult task to keep them from wild ventures and mad projects. North Carolina has long slumbered; she is now about to become rail road mad. Roads will be projected in all directions—and unless the state shall adopt some uniform and judicious policy, her works will destroy, instead of strengthening each other. There is nothing so much needed, as a strong and clear view of the proper policy of a state, in relation to internal improvements.

I should like to see such writers as G. L. C. engaged in this task. I can see that he has thought much ,and well, on the subject. He has a mind to grasp extended and enlightened plans. I would not have him construe my disagreement, in particular cases, into a condemnation of his general principles.

There is a mistaken notion gaining ground in our legislatures—that it is right to charter every company which applies. This is a suicidal policy. Rail roads are hot-house plants—they can no more exist without a certain degree of protection, than tropical plants can grow without a shelter from our frosts.

After a rail road is chartered, the state is pledged, (and if not, it should be pledged,) to protect that road from competition to a certain extent. If the wants of the community manifestly require another work, then it is proper to charter it. I would not have this principle carried so far as to prevent us from keeping pace with the improvements of the age. But we should weigh the matter well. We should be perfectly satisfied that the work already existing is unfit to accomplish the end intended, before we allow another to be made which will injure the first.

Every rail road is an invention, so far that one was never tried before, under the same circumstances. We cannot say of a rail road, as of a wheat machine, that, because it has operated well it one place, it will do equally well in another. It is by no means a fair deduction, that because a rail road from Boston to Providence has succeeded, one from *Wilmington to Halifax* will succeed. Every road, therefore, is a new application of the principle, and consequently an invention. We should pursue the same policy in these inventions as in others, viz: protect the inventors from competition for a limited number of years.

I will suggest a scheme, which I acknowledge to be perfectly Utopian. I merely use it as the best means of making clear the idea I wish to convey; and perhaps some one of better judgement and greater experience, will be induced to devise some plan of the sort. Suppose we could have a certain number of *disinterested* men of great intelligence and sound judgement, chosen from all parts of the state, to compose a board o internal improvement. This board should meet annually, and all applications for charters should be laid before them. The legislature should grant all applications approved by them, and grant only those recommended.

The board must devise a general system of all the works in a state which seem to them expedient. This system would of course be subject to constant modification. The proceedings should be published from time to time, to stimulate capitalists to embark in the works recommended. When a company applies for a charter, the board should have some little regard to its effect on the entire system, but should consider particularly whether it weakens a company already chartered. There should be very strong reasons to induce the board to refuse a charter which does not injure any existing work. Every charter granted, unless it is for a work embraced in the original scheme of the board, would make it necessary to change the whole system. We cannot force the public. This board could only direct public attention to feasible schemes. They should direct, not attempt to control absolutely, public opinion. If they cannot get the works made they have recommended, they should grant charters for works approaching as near as possible to their plan. They must hold one principle as inviolable—the interest of every work chartered must be consulted, before granting a new charter. I would not let a turnpike deprive us of the chance of having a rail road; but I would not charter one rail road to destroy another.

This would be an excellent scheme if we could only find men fit for the office. But where will we find men who would lay aside self interest, and think only for the public good?

The effect of such a plan, were it practicable, would be to attract capital from all parts of the union. Rail roads would spring up, as if by magic, wherever the wants of the community required them. Our hardy sons would no longer have to seek wealth and prosperity in the wilds of the west. We should have a theatre of action at home sufficient to employ all our enterprise.

I most earnestly hope that some of your correspondents may be urged by these hints, to do what *I* pretend not to be able to do—to give the world some feasible plan for promoting these ends.

P. Q.

For the Farmers' Register.

COMMERCIAL REPORT.

A prosperous state of trade prevails generally in all parts of the world—and no portion of it is deriving greater advantages, or accumulating wealth more rapidly, than the southern portions of the United States. There is no article of domestic produce or manufacture, that does not command a good price—but the great staple, cotton, surpasses all others in extent and value.

The total imports of cotton in Europe in 1835, were 1,531,500 bales, of which 1,032,600 were from the United States. Great Britain received 1,091,200 bales, of which 763 200 were from the United States. France 324,400, of which 225,500 were from the United States.

The total consumption of Europe was 1,453,200 bales, of which 1,036,850 bales were from the United States. The annual increase of consumption in Europe during the last five years varied from 25,000 to 85,000 bales. In 1835, it was about 75,000 bales. The increased import from the East Indies is considerable, and an unusually large supply is expected from thence during the present year. A contrariety of opinions still prevails as to the extent of the crop grown in the United States in 1835. Estimates vary from 1,300,000 to 1,350,000 bales. The supplies in the great southern and western markets which had been withheld, are now increasing fast, and will soon reach, if not exceed, those at similar dates in 1835. Prices, however, have materially advanced. The current rates in Petersburg are 16 to 18 cents.

Tobacco continues in brisk demand, at all prices from $5½ to $13. Manufacturers have extended their operations, and stemming qualities are particularly sought after. The European markets exhibit no favorable aspect, except for stemmed, which is scarce, in consequence of the small quantity shipped last year.

Flour continues steady at $6¾ to $7. Large quantities will no doubt be soon received from the interior of New York and Pennsylvania, where it has been locked up by the ice for some months.

The expected increase of bank capital in this state will not be obtained this year. The legislature not having had time, during a session of three months, to act on this subject. This may tend to retard the improvements which are now in embryo. An advance in the price of the stock of the existing banks has resulted from this neglect, and 118 to 120 per cent. is now spoken of for Virginia and Farmer's bank stocks. Petersburg Rail Road shares command 119—Greensville and Roanoke $8 or $9 advance on $35 paid. The subscription to the Raleigh and Gaston Road, which is re-opened for a limited amount, is freely taken, and the work is commenced..

The cotton manufacturing establishments are in a thriving state. The stocks of these in Petersburg, which are now in operation, command 25 per cent. premium, or more. Their goods are in request in all the southern, and some of the northern markets.

X.

March 25th, 1836.

TO SUBSRIBERS AND CORRESPONDENTS.

This number will close the third volume of the Farmers' Register. The index will be sent with No. 1. of Vol. 4, and at the same time, a list of subscribers for the present volume. The subscription list, neither at this, or any other time, can be supposed to exhibit the extent of the circulation and support of this journal—as very many new subscribers order all the back volumes: and in that manner, this later demand, heretofore has been for nearly 200 copies of each of the two first volumes, and will probably not be less hereafter, for the third, in addition to all the names which are now on the list. According to the actual list, the number of subscribers has been slowly but regularly increasing through the three years. What is better than mere numbers, it is believed that the Farmers' Register, on the whole, has at least as good a *paying* list of subscribers, as any journal in the United States. The *pecuniary support* has been such as we have every reason to be content with, and thankful for, if it should be continued without diminution. But to deserve and command a continuation, or increase, of support and patronage for an agricultural journal, depends but in a small degree on its editor—and no effort on his part will compensate for the absence, or scarcity, of the contributions of the many practical farmers, who can, and ought to be his correspondents. Such communications have heretofore formed the main value of this journal—and its greater or less future usefulness must depend on the degree of abundance, or scarcity, of supplies from such sources. A periodical that ceases to gain on the public favor, is almost certain to be losing what it had enjoyed—and especially for a journal like this, a good subscription list for any one valume, is no guarantee for the profit of the next. We therefore presume to remind our friends that a relaxation of effort to sustain the publication, may soon change its prosperous condition to one of decline, and even ruin.

Various things connected with our peculiar position, and private circumstances, together with the novelty of the undertaking in this region, have at different times affected injuriously the mechanical execution of this work. The causes of such effects have never been voluntarily permitted to exist, nor were they produced by any wish to avoid making proper and sufficient expenditures—and every offence to the eye, in the quality of paper, or of printing, has been to us a source of deep regret and mortification. Such things are scarcely to be avoided at all times, in the infancy of such an establishment, or in a publication office on a very small scale, where the deprivation or neglect of a single facility, or means, may cause serious injury to the execution of a work, when the publication cannot be delayed. We have found that it is impossible to have first-rate printing executed, at all times, upon a single publication alone—and on that account, and to insure the command of sufficient and suitable labor and facilities at all times, we are now incurring the expense and risk of establishing a job printing office, which, for book work, especially, will be equal to any in the state. The necessary arrangements are made, and are just now in operation—and whether we may gain or lose by this extension of business, the measure will be the means of insuring the printing the future volumes of the Farmers' Register to be better than any previous one. It is also hoped that our experience of paper-makers, and sellers, has been bought dearly enough to secure us hereafter from such impositions as we were compelled to submit to, (and without even any saving in price,) in parts of the first and second volumes. There has been no such fault more recently, as to the quality of paper—and it is expected that the existing arrangements will prevent any future complaint on this score. In every other respect, no effort, or reasonable and proper expense, will be spared to render the publication deserving of all the favor and support that it may receive.

GEOLOGICAL SURVEY OF NEW YORK.

The Secretary of State of New York, acting under the previous order of the legislature, has reported a plan for a geological survey of that state, on a liberal and magnificent scale. The details of the plan we will publish hereafter. According to the estimate of the report, the survey and publications connected with it, will cost $104,000, and four years time and labor will be required for the complete execution. The legislature has approved the report, and appropriated $26,000 for the operations of the first year.

SEASON AND STATE OF CROPS.

Though another month has passed since our last remarks on the season, and that, the one which usually brings the most marked changes of temperature, and movements of vegetation, yet the words then used would be nearly correct now. In all March, there have been but two or three days mild enough to suit the time of year—and as late as this day, the 25th, winter weather continues. Vegetation has scarcely begun—and the general predominance of wet, as well as of cold weather, has made the preparation of land for spring crops even more late than the commencement of spring weather.

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Miles Cary
Robert Randolph
Robert M. Pulliam
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Thomas Ladd
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Sam. M. Pleasants
Joseph Sinton

Henry.

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Ro. Hairston

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Archibald Atkinson
Joseph P. Whitehead
James Peden
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Jacob H. Duck
John R. Todd
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Joel Holleman

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Daingerfield Lewis
John Hooe
H. W. Johnson
Gustavus B. Wallace
Charles Tayloe
Carolinus Turner
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King William.

Beverley Kennon, U. S. N.
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J. F. Brockenbrough
Wm. S. Fontaine
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Edward Hill
Walker Hawes
John Sizer
Thomas Jones
John S. Barrett
Wm. Westmore
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James Croxton
John Lumpkin
Richard Gwathmey
James Johnson

King & Queen.

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C. G. Henshaw
Wm. Dew
Wm. Boulware
T. J. Gresham
John Du Val
Tho. Haynes
Wm. Todd
Arch. R. Harwood
Robert Pollard, jr.
Hugh Campbell
Christopher B. Fleet
Moore G. Fauntleroy
Alex. Fleet
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James C. Roy
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Ralph Edmonds
James Harding

Loudoun.

George Carter
George Richards

Louisa.

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Elijah Hutchinson
James Watson
James M. Morris
J. Shelton
Wm. Shelton
Ch. Y. Kimbrough
Frederick Harris
Wm. Nelson

Lunenburg.

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Sterling Neblett
Wm. G. Overton
Henderson Lee
G. C. Hatchett
David A. Street
Joel M. Ragsdale
Thomas Adams
James Fisher
Millington Hines
Wm. H. Taylor

Lynchburg

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John M. Warwick
Wm. Daniel
Wm. Radford
John Smith
Micajah Davis
Ogden G. Clay
Elijah Fletcher
John M. Otey
Wm. N. Meriwether
George Markham
Walter Henderson
Ro. L. Coleman
Richard K. Crallé

Madison.

Nathaniel Welch
Linn Banks
Blankenbeker & Carpenter
Wm. T. Banks

Mason.

Peter H. Steinberger

Matthews.

Wm. H. Roy
Edmund Jones
C. Tompkins
Wm. Williams
Omega Billups
Wm. Shultice
Alfred Billups
Augustine M. Braxton

Mecklenburg.

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William Townes
Alexander Jones
Peter Puryear
Tingnal Jones
Philip Rainey
Henry E. Coleman
Thomas M. Nelson
J. G. Baptist
Abraham W. Venable
Tucker Carrington
Samuel N. Watkins
C. R. Kennon
Roger B. Atkinson
George Tarry
Richard Russell
Mrs. Mary Baskerville
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Paul C. Venable
Francis R. Gregory

Middlesex.

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R. A. Christian
Carter Braxton
Robert Healy
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Robert Mackan
R. M. Segar

Monroe.

Wm. Burke
Andrew Beirne
Hugh Caperton

Nansemond.

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Allen R. Bernard
Mills Riddick
Joseph Bunch
David Jordan
Thomas S. Shepherd
Richard H. Baker
E. R. Hunter
S. C. Corbell & J. H. Godwin
Richard H. Riddick, sen.
Robert Lawrence
John C. Crump

Nottoway.

William I. Dupuy
William Fitzgerald
Travis H. Epes
James Jones
Samuel B. Jeter
A. A. Campbell
Robert Fitzgerald, sen.
Benj. W. Fitzgerald
Francis Epes, jr.
Isham G. Lundy
Wm. B. Irby
Richard Jones
Thomas Jackson
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Peter E. Williams
Charles Smith
John P. Dupuy

Nelson.

Mayo Cabell
Daniel Higginbotham
Thomas S. M'Clelland
N. F. Cabell
Joseph C. Cabell
Thomas Massie
J. Garland

New Kent.

St. George T. Coalter
George Kennon
Clayton G. Coleman
J. W. Royster
Wm. R. C. Douglas
Conrade Webb

Norfolk Borough.

Littleton W. Tazewell
George Wilson
Wm. H. Macfarland
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George Newton
John N. Walke
Richard G. Baylor
Wm. E. Taylor
Maximilian Herbert
Thomas Nash
William Tatem
Alexander Galt, jr.
John Stone
John Tabb
Edward H. Herbert
Samuel D. Rawlings
William French
William Wright
Mechanics' Institute
N. C. Whitehead
John H. Nash
Dr. ——— Old

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Josiah Wilson
A. S. Foreman
Richard W. Sylvester
Alex. Etheridge
R. W. Young
Wm. Collins
J. W. Murdaugh
Mordecai Cooke
John Hodges
Robert B. Butt
David Griffith
Wm. H. Wilson
Richard Carney

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Isaac Smith
Wm. S. Floyd
Severn E. Parker
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Griffin H. Foushee
Samuel Blackwell
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Joseph Harcum
W. M. Beane
Job Slacum

Orange.

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John Lee & J. Willis

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G. A. Smith
J. Newman
Francis Conway
D. M. F. Thornton
G. V. Price
John F. & C. Conway
James Barbour
James B. Newman
J. Morton & U. Terrell
Edmund P. Barbour

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Thomas Atkinson
Francis Follet
Charles F. Osborne
Luke White
Robert Leslie
Richard F. Hannon
Geo. W. Stainback
Ro. R. Collier
Thomas Whitworth
Ro. B. Bolling
J. W. Campbell
Ro. Ritchie
John V. Willcox
Hartwell P. Heath
Wm. Robertson
Jabez Smith
A. B. Spooner
Theophilus Gilliam
Joseph Bragg
Holderby & M'Pheeters
Donald Mackenzie
Charles D. McIndoe
L. E. Stainback
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Samuel Mordecai
John B. Townes
John Ennis
John Pegram
Patrick Foley
S. D. Morton
Stephen G. Wells
Th. M. Buford
Ro. B. Wells
John T. Robertson
Robinson & Newsom
Richard A. Worrell
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George Wilson
Wm. H. Dupuy
Nath. Wilson
Walter Coles
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E. W. Shelton
Wm. Murray
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Milton P. Atkinson
Wm. Old
Rob. K. Dabney
Silas Bryant
Obediah Duval
James M. Harris
Wm. S. Dance
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J. Watkins
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B. Trueheart
Abner Crump
Thos. P. Nash

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Smith Shepherd
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J. Rogers
John Petty, Jr.

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Wm. Berkeley
Joel W. Dupuy
Wm. Seay
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E. Root, Jr.
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Isaac Read
Asa Dupuy
Simon Hughes
James H. Wilson
James Calhoun
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Wm. B. Harrison
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Junius K. Horsburgh
Howell Heath
Theron Gee
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Zachariah Harrison
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Elgin Russell
Thomas Cocke
James B. Cocke
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Theodorick Bland
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Thomas S. Gary
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Andrew Nicol
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Wm. Brockenbrough
Bernard Peyton
Thomas Green
John Carter
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Windham Robertson
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George Watson
Archibald Blair
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Joseph Trent
Thomas Burfoot
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Henry Watkins
Lewis Chamberlayne
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Wm. Taylor
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Alfred Leyburn
Wm. Inglis
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Scervant Jones
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Harford.

John W. Rutledge

Kent.

George S. Holliday
Wm. S. Constable
Colin F. Hale

Montgomery.

John P. C. Peter
B. S. Forrest

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Queen Anne's County.

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Wm. Carmichael
Richard T. Earle

Thomas Emory
John Tilghman
Wm. H. Bordley
Pere Wilmer
Stephen L. Wright
John C. Ruth
Edward Tilghman
Jeremiah L. Boyd
Thomas C. Brown
Thomas B. Cooke

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Talbot.

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S. Hambleton
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Nathan Kite
Athenæum
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John Holloway
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Flushing.

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ILLINOIS.

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Natchez.

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Burwell Boykin

Darlington.

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Cataba.

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Greene.

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R C Randolph
R W Withers

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Lawrence.

Turner Saunders
Lawrence Watkins
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A M Degraffenreid
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Robert Paine
Drury Vincent

Lowndesborough.

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Hugh Nelson

Montgomery.

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W D Pickett
Addison Powell
Thomas S Mays

Newbern.

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Perry.

William H Jones
Bird M Pearson

Selma.

James M Calhoun

Tuscaloosa.

Nelson A Crawford

Nicholas Perkins
Benjamin Whitfield

Wetumpka.

Joseph J Griffin

Wilcox.

George W Botts

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Gadsden.

Bryan Croom

Jefferson.

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John McLemore
James L Parish
Joseph B Watts

Leon.

Augustine Alston
John Parkhill

San Pedro.

John C McGehee

Tallahassee.

Farquhar Macrae
H B Croom
Samuel H. Duval

NORTH CAROLINA.

Beaufort.

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Wm. H. Pugh
James G. Mhoon
Thomas Laversage

Cabarrus

Robinson & McKinley

Caswell.

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John Comer

Chatham.

Jonathan Haralson

Chowan.

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D. Macdonald
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Augustus Moore
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Davidson.

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Edgecombe.

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Fayetteville.

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John Owen

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Joseph Whitaker
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Royster & Beasley
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Johnston.

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Wm. D. Cobb
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Isaac Croom
John C. Washington
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Lincoln.

Vardry McBee

Martin.

David Williams

Hertford

Colin W. Barnes
James H. Wood
Tristan Capehart
John Waddille
Alfred Darden
Kerr Montgomery
J. C. Moore

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Isaac Sessums
Thomas Davis
John F. Bellamy
William Bellamy
Bennett Bunn
Joseph S. Battle
Joel Wells

John J. Bunn
James N. Mann
Wm. Dozier

Newbern.

Wm. Hollister
Wm. Gaston
Wm. B. Wadsworth
Oliver S. Dewey

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Wm. W. Wilkins
Wm. B. Lockhart
Andrew Joyner

Orange.

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Walker Anderson
Thomas Ruffin

Pasquotank.

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Thomas McGehee
Bolton & Dixon

Pitt.

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Wm. May

Rockingham.

Rawly Gallaway

Tarborough.

Noah Thompson
Theodore Parker

Wake.

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Leonard H. Seawell
Bennett T. Blake
John Hinton
Gavin Hogg

Washington.

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Warren.

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Weldon N. Edwards
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