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TRANSACTIONS

OF THE

SOCIETY

FOR THE

PROMOTION

OF

USEFUL ARTS,

IN THE

STATE OF NEW-YORK.

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1807.

Officers of the Society for the Promotion of Useful Arts, for the year 1807.

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PREFACE.

THE *Society for the Promotion of Agricultural Arts and Manufactures* having expired by the limitation contained in the act of incorporation, another act of the legislature has been obtained, reviving its corporate powers under its present name, and a modification in some respects altered. It was found by experience that much of the business of the society could not be so well conducted at meetings of its members generally, as by a few selected for the purpose of devoting their special attention to those objects that required a considerable share of deliberation. The new act therefore provides for the appointment of a council, whose duties are particularly defined by a by-law, and embrace all such matters as were judged to merit more than ordinary investigation or care in their adjustment. Some other alterations were made, but this is the most important, and that from which the most beneficial effects are anticipated, as it will always secure a select number of the most efficient members to watch over the concerns of the society, and infuse a spirit into its proceedings.

THE present publication comprehends discriminately the transactions of the society, both before and after its re-incorporation, a circumstance which it was not thought necessary to notice in the title-

page. On perusal it will be seen that very little borrowed matter has been admitted; such it was considered would too much exclude what was original and esteemed of sufficient merit to be presented to the public. It will not be amiss in this place to observe, that communications of any useful discoveries will always be thankfully received; and gentlemen, whether belonging to the society or not, who are disposed to make experiments in agriculture, or who may be so fortunate as to become acquainted with any thing original that may promise to be productive of a public benefit, are invited to impart them to the society.

For the patronage of the state the gratitude of the public is due, but it is regretted that this patronage has not been extended so far as to confer the ability of accomplishing designs which aim at more extensive usefulness than has yet been attained: Still it is hoped, that, emulating those wise governments which have considered it the best policy to assist, with adequate means, the efforts of its individual or associated subjects, engaged in plans for promoting the public good, our legislature will not deem it impolitic profligacy to permit a trifle of its vast revenue to be employed for purposes acknowledged to be essential to the prosperity of a nation. It has long been contemplated to attach to the society so much soil as would suffice for agricultural experiments. The uses of such an acquisition need not to be detailed, they will spontane-

ously rise in numerous forms to a reflecting mind; but the means of encompassing this end have hitherto been unattainable. It is also intended, if possible, to establish a library, to be composed of publications relating exclusively to the arts; this would be the means of bringing home to us the improvements that have been made, and which are daily making in other parts of the world. Besides the fund of useful information which this would produce, and which would otherwise be lost to us, it would enable those who are in pursuit of any undiscovered good to avoid the track of useless research, and take that which would most probably lead to a successful issue; it would also, in many instances, save them from the toil and expense of inventions which others have achieved before them, and it might give an impulse and a direction to some genius that would eventually be productive of some inestimable good. But this likewise is almost a hopeless object, unless public aid appear in its favor.

Distributing premiums for useful discoveries and for executions in the arts of extraordinary excellence, has ever been considered among the most powerful stimulants, and much good has been produced by the energies thus excited. The little that has been done by the society in this way it is believed has not been without effect; but it is to be lamented that *but a little* is all that could be done. The patriotic wish of doing more was

cramped by a poverty of means, and not permitted to expand into action.

Although the title of the society points at the useful arts generally, it is intended to consider agriculture the chief, and to make improvement in it always a principal aim. Possessing a soil and climate different from those of the countries to which we are accustomed to look for precedents; finding labor more difficult to be obtained than lands, and being in a variety of other respects situated under circumstances dissimilar from those of other nations, we have a field for improvement before us, absolutely boundless, and no pains should be spared to make advances in it; but the means competent to this end can be expected only from the government. Here to be lavish would be true national economy. The future usefulness of the society will therefore, in a great measure, depend on an extension as well as a continuance of the patronage of the state.

TRANSACTIONS, &c.

A Letter from ROBERT R. LIVINGSTON, *Esq. President of the Society, and Minister Plenipotentiary of the United States in France, to* BENJAMIN DE WITT, *M. D. of Albany.*

PARIS, *24th Nov.* 1802.

DEAR SIR,

THERE are many obstacles to a stranger's learning the arts or agriculture of a foreign country, in a short period—the prejudice of the peasantry, the want of faculty in their language, and the mistakes that this naturally leads him into, both in putting his questions and receiving their answers; yet these may be overcome by a man who makes it his object and devotes his time to the acquisition of this knowledge, but never by one who only travels post, and is compelled to confine his observations to what he sees, or to the hasty information he can pick up at the post houses. This must be my apology for the imperfect remarks I now propose to submit to the society.

I LANDED at L'Orient, the 16th November. This season of the year is extremely unpleasant in

France, and more particularly on the eastern sea coasts, where it rains continually ; while in the interior, though they have less rain, they have thick and heavy fogs, during which, as far as I may judge from the autumns I have seen, weeks pass away without a clear view of the sun. The extreme bad weather we had upon our voyage, and the necessity of having our baggage unpacked, washed and dried, our trunks having been several times flooded in the cabbin, compelled us to remain eight days at L'Orient. We did not reach Paris till the 3d of December : I mention this, to shew how unfavorable the season was for the acquisition of agricultural knowledge on our journey.

L'Orient is an extremely pretty town, and like most of those in France, is built of white stone and paved with the same. It was formerly the *emporium* of the East-India trade, by favor of which it flourished—the magazines of the company were spacious, elegant, and well arranged ; but at present they are only melancholy monuments of their former splendor, and contain nothing but a few cargoes of American tobacco. I could not find that there was any manufacture introduced there to supply the vacuum made by the diminution of its commerce, except a small fabric of China, which I visited. It is made with the same materials as are used here for making the Seves. These are brought from Paris ready mixed for the use of the manufacturer, and as far as I can judge, neither

the forms nor quality of painting were inferior to those of the Seves, except that having no vent for, they did not employ themselves in those expensive works of ornament which occupy the artists of Paris; to give you some idea of which, I will just mention a set of China now here, and made for Lord Oxford, each plate of which cost 17 guineas the first hand. This fabric of L'Orient is worthy of mention, because as we indulge ourselves in the luxury of French China, on account of the beauty of its forms, we may obtain the sort we use from thence cheaper, and at much less risk of breakage, and not inferior in quality to that exported from hence. I have sent to Dr. Mitchill samples of the earth made use of in this manufacture. Could it be found in our state, it would be very easy to send you artists who would gladly go over to work it. The market of L'Orient is one of the best I have seen in France. It abounds in sea and river fish, poultry and game. The carcases of beef and mutton are small but fat, and the last, of the finest flavor of any I have met with either here or in America, where, by the bye, the mutton is incomparably better than at Paris. Fruit is also very plentiful and very fine. Perhaps the adoption of the form of their markets might contribute to the health of our cities. It does not at L'Orient, nor at any other place which I have seen in France, consist as with us in a building appropriated to that purpose. The market women (for no men engage in this employment) assemble in a square, in the

centre of which is a fountain. Each has a large umbrella, which covers her and her productions from the rain and sun. The fish women, the poulterers, the herb women, &c. all have their separate quarters, so that you are never at a loss to find what you wish to purchase, nor are any suffered to deal in different sorts of commodities. Butchers, or rather butcheresses, for these too are women, their husbands after having killed the cattle assigning to them the care of disposing of it, being in a different quarter from the rest of the market. By this regulation the market affords no place for the collection of filth, or the stagnation of air. When the market hours are over, the stalls and umbrellas are removed, and the whole may be perfectly cleaned; whereas no care can keep our markets from being sources of corruption, at least till we give them brick or stone pavements: For the animal and vegetable substances, which even, in the very act of washing, find their way below the flooring, garrison an impregnable fortress, from whence in hot weather, with certain aim, they shoot envenomed arrows winged with death. Though the decay of trade makes this place abound in beggars; yet there is much less appearance of poverty than one would expect to find. This is probably owing to the ease of subsisting near the sea, where fish is easily obtained; to horses not consuming the food of men, for none except post horses are kept in L'Orient, all transportation being done by porters; and above all, to the forests and chesnuts

which are in the vicinity of the town, and which afford bread to many of the inhabitants, if I may judge by a view of the most frequented streets, which, when I was there, were literally paved with their rinds; that they are very wholesome food, the looks of the children, who chiefly live upon them, manifest; for never have I seen any more healthy and ruddy. This, with the warmth and comfort of their cloathing, would repel your charity, were it possible to resist the importunity of those little chubby cheeked beggars, whose innocence and good-nature forbids you to be angry, though you know they have no physical wants to supply with the produce of your charity.

The soil in the vicinity of this town, appears to me chiefly gravelly. The stone used in building is brought down the Loire, and transported by sea to L'Orient. The enclosures are made of earth, sometimes, but not often, faced with round stones. On the top of the bank we now and then see an imperfect hedge, but in general they are covered with genista, which grows wild here in great abundance, and is extremely beautiful, with its fine pendant branches of light green, covered with thick yellow flowers. These enclosures are for the most part extremely small, seldom containing five acres, and very often not more than one. For what purpose this extreme small division is made, I know not, and it surprised me more, as many of these enclosures seemed to be very imperfectly cultivated,

and some not at all. But as Brittany, of which this makes a part, has suffered more than any other department of France by the war, perhaps this want of cultivation may be derived from the same source, and yet the abundance of villages and their apparent population, speak a different language.

As the route to Nantz runs along the sea coast, which in all countries exhibits the worst lands, we passed over several barrens though of no great extent, covered with heath. We found them paring it in some places—for the common husbandry is to mix it with stable dung, and when rotted applying it to their grain. I afterwads found that it is also burnt, and the ashes applied to that use, more particularly upon the downs in Flanders and Holland. We passed on this route through a great number of villages and some very considerable towns; in none of which, contrary to our expectation, we found the beggary we had left at L'Orient. The villages are all built of stones. The streets so extremely narrow that in many of them two carriages cannot pass. The stable forms the front of the farmer's house, and you generally go through this to his own habitation—though some few have courts, the stables forming the sides. This gives the villages a gloomy appearance, and contributes to render them extremely dirty. As you leave the sea coast the soil improves, and no land is to be seen, except such as is left in wood, that is uncultivated.

After leaving Nantz, which contains about 70,000 inhabitants, and lays upon the river Loire, and has been and still is the centre of a very considerable commerce, but which I shall not stay to describe, as I am not writing travels, but a brief sketch of the agricultural state of the country; we travelled, for the great part of the way, to Orleans, through the most beautiful and fertile country in the world. The road lays along the Loire, and is altogether on a bank raised above ten or fifteen feet higher than the level of the river—the opposite bank of which is elevated and covered with towns, villages, and the ruins of churches and castles; for it was here the barbarous rage of destroying every monument of religion or the ancient grandeur of the nobles most prevailed; while the side on which we were consists of low or interval lands, whose average breadth, for an extent of about fifty miles, I take to be not less than eight. The back ground is elevated, and like the opposite side of the river, covered with towns and villages. This low ground is all in the highest possible state of cultivation. Adjoining the road, and below the bank, are the farm houses, surrounded by a garden filled with fruit trees, with vines, trained up the trees and extended from one to the other—every house also is covered with a large grape vine, at least on three sides. Next to these gardens, are the arable lands, a few spots only excepted, which are turned to grass, as being too low to plough. The grain is all sown upon narrow ridges, made by laying two furrows

back to back; these are raised so high that I conceived it hardly possible to effect it with a plough, which they assured me was generally the only implement made use of: However, I saw some instances of their raking out the intervals with hoes. In the management of the plough, they certainly are more skilful than in our country, or in any other I have seen, though their ploughs appeared to me as ill-constructed foot ploughs with very long beams. But as the season for ploughing was over, and the heavy rains had set in, I did not see them used.

Permit me here to remark, that the practice of planting a few vines round the house, might be usefully followed by our small farmers; and though its product should not be wine, yet the fruit would add to their enjoyments and their health. The advantages of this mode of planting are, that by a straw mat, or by drawing the vine into the house during the winter, it might have the fullest protection from the cold—that if the stem is long, it wants none from cattle when growing—that the soil about the house is always rich and warm, and that the fruit will be secure from robberies: Add to this, that it adds much to the beauty of a small house, and shelters it from the heat of the sun.

After leaving the low lands upon the Loire, we enter a country of light loam, upon a bottom of white soft stone, which continues all the way to Pa-

ris. From this stone all the buildings are created, not only in Paris, but in the towns and villages upon this route. It cuts, on first coming out of the quarry, with almost as much facility as wood, and never becomes very hard. Blocks of the most enormous size, are raised for steps, troughs, &c. for many miles together where the country is elevated. This stone is excavated, and the caverns make very comfortable cottages. The chimney passes thro' the top, and is the only part of the house, except the door and windows, that appears. The earth above the house forms a little garden, or makes part of a vineyard. I stopped to visit some of these houses, or rather caves, which I found neat and warm. A pole in the middle, generally propped the roof, where the room was large. From this country to Paris the vine was generally cultivated, nor were any enclosures to be seen, except parks or garden walls. At Orleans, I found a large manufacture of cotton yarn, worked by Arkwright's machine. This employed about three hundred people, and was capable of employing as many more. The motion was given to the works by a steam engine. This establishment was originally formed by the late Duke of Orleans, in company with a Scottish gentleman, by the name of Forlow, who is now the sole proprietor. I received many civilities from him while at Orleans, and was shewn every part of this extensive manufactory. The yarn is principally worked up at Tours into coarse cotton cloths. I see no country in which these ma-

chines can be more usefully introduced than in France, since the labor of women and children is extremely low, and these alone are necessary to this manufacture. Should this ever be extensively done, it will be a fatal blow to the fabrics of Britain; cotton being at present the most extensive branch of them. They however flatter themselves, that the scarcity of coal, and the dearness of fuel in this country will always afford them great advantages over France; though I believe they will be more indebted for them to their extensive capitals and their knowledge of business upon a great scale. Of this, for the most part, the merchants of France are extremely ignorant, nor, if I may judge by the late commercial regulations, are they much better understood by the government.

On the third of December, I arrived at Paris, and have given you this general sketch of the country, that I might introduce those few particulars that might afford you a comparative view of this country and our own.—First, the peasantry, or more properly speaking, the cultivators all through Brittany, are different from what British prejudice has represented them. They are a strong, healthy people; the women, for the most part, fair and ruddy. Neither the men nor women are so tall as the Americans, but they are more spread, and they certainly are not less hardy, than the people of our country; since, at the season that I saw them (the last of November) they were constantly in the field,

the women washing at every brook, or spinning with a distaff, while they were tending their cows; though it never failed to rain every day during the period of my journey; to this I attribute their healthy, ruddy appearance, at very advanced periods of life. Even their pleasures are found *sub jove;* on Sundays we found them dancing every where; not as with us, in a little close room, but in the open air; and indeed, every village has a little wood which serves as their dancing chamber. This is lit every Sunday or holiday night with a few lamps, when all the villagers assemble immediately after dinner, and dance till about ten at night. Their dress is warm and neat, but never fine; how richsoever a cultivator is, neither his wife or daughters ever change the form of their dress, or ape the higher ranks. They wear a stuff gown, generally brown, with a red bib and apron, and plain linen cap, yarn stockings and wooden shoes, which are well calculated for this climate, and for people who are always abroad. Leather shoes would be continually drenched with water, while those of wood, in which they place two pair of socks, are very warm and dry, and are left at the door when they come into the house. I found at every house, at which I stopped, good bread, plenty of milk, and the best butter I had ever met with; though I also found cheese at every farm house, I met with none that was good, and a great deal that was excessively bad, made of skim milk, or butter milk, after it had begun to spoil. As this was not

a wine country, the common drink of the farmers was a light weak beer. Upon the whole, I saw no reason to believe, either from the looks of the peasantry or from the provisions I found in their houses, that they were in want of any comforts of life, which their station required. Their moderation in the article of dress, in which they made no sacrifices to vanity, and their sobriety (for I have not seen three drunken men in France) enabling them, not only to procure more of the necessities, but even to afford more to their amusements, than the people of any other countries. Their pleasures are all social, and they know of none in which their women do not participate; which may, among other causes, contribute to their sobriety and cheerfulness.

The farm-houses are very generally built of stone, and covered with thatch of rushes. The thatching is very thick and neat, and near the sea, it is generally overgrown with moss and other plants, so that it is a warm and not a dangerous covering, as it would be in our country: you will remark that these observations are to be confined to the country I travelled through on my route to Paris; and are not applicable to many other parts of France.

Enclosures.—Few of these are to be seen after leaving Nantz; those between that and L'Orient I have mentioned. On the low grounds along the Loire, fields are separated by ditches only; but enclosures are of little moment, where no cattle are suffered to run at large without a keeper.

Cattle.—At L'Orient and on the sea coast of Brittany, they very particularly resemble those of our state in the hands of bad farmers. The cows are rather smaller than our Dutch cows, but in return their butter has a flavor, which is no where else to be met with. It is in such request as to be carried from Rennes to Paris for breakfasting butter. As you advance into the country, the cattle are much larger and finer, and equal to our best Connecticut cattle; but are in general more compact and square. They are almost without exception either cream or dun colored, with black or dark mouse colored mussels. They were all housed at night when I travelled through that country, and indeed are so all the year round. In the day they were led out to pasture, and always with their backs and loins covered, both cows and oxen, with a linen cloak—a woman or boy tended them, even though there was but a single cow; but that the time might not be lost, they were employed in spinning with a distaff, and sat with as much ease and gaiety upon a wet bank in the month of December, as one of our country women would do upon a bank of violets in June. I could not find that this had any effect upon their health. Rheumatic complaints are uncommon here, and colds much less so than with us. May not this be owing to the habit of living in the open air, contracted by all classes of people from their infancy. I do not know whether the color of the cattle is of any importance; but it is certain that our dairy maids insist that the milk of a

red cow is richest; may it not arise from the color being indicative of different races. What leads me to think so is, that in France black cattle are very uncommon; whereas through the whole of South-Holland and Brabant, I did not, though the fields were covered with droves of cattle, see a single cow that was not either black, or a mixture of black and white, which rendered them either pied, or of a kind of blue grey; not one was either red or spotted with red. Nor did I find any butter in Holland that equalled the flavor of the Brittany butter; so that it is possible that the American cattle may be from this or other stocks, which differ not only in their color, but in the quality of their milk.

The horses in Brittany are small, and not remarkable for any peculiar beauty or defect; but as you advance towards Paris, those in common use are of the Norman breed. These are evidently the parent stock of the Canada horses, but are much finer for their having been more attended to. They are remarkably square and heavy, particularly in the hind quarters, and are broader across the buttocks than any other race I have ever seen. Their forehand is not fine, their necks being generally short, though there are many exceptions to this defect. Their head and eyes are good, and they are found to be the best and strongest race of horses in Europe. English and Holstein horses have been frequently tried in Paris, but they are said to be found not to

bear the shock of hard driving upon the pavement; however, this does not accord with my own experience. Among those I drive, I have an English horse and three Normans, and I see no difference in the looks of any of them, though they are kept and driven alike. The weights carried in the carts here would atonish you, and I am quite convinced that either our horses are inferior, or that we do not put them to exert half their strength. I measured one of the country waggons in Flanders; I found it 11 feet from axle to axle, and the box 18 feet long, and about twice the breadth of our waggons. These are drawn by four horses, generally one in shafts; but as if this enormous machine would not carry enough, there is frequently a box hanging by chains below the waggon (for the wheels are very high) which also carries a part of the load. To shew how much every thing depends upon custom or prejudice, and how little upon reasoning, in Holland, where horses are large, fat and fine, and the road a dead level, the only carriages used by farmers are Dutch waggons, exactly resembling those of our own country, except that they are not much more than half the width in the bottom, and of course do not carry more than half as much. But to make up in show what they want in use, they are covered, painted, and often gilded in the most superb manner; and that their finery may not escape your notice, in many places there are two large round plates of copper, suspended on a pin passing through the centre and

fixed in the axle-tree, which serves the double purpose of musick to the driver and notice to the traveller.

Asses are much used between Nantz and Paris, and I am convinced in this particular our prejudices have deprived us of an extremely useful animal. They are in general very small, even less than those brought from the Cape de Verd Islands; but their size bears no proportion to their strength. You meet numbers of them on the road at the same time carrying two large loaded paniers and a stout fat woman, whose feet nearly touch the ground as she rides. Sometimes you see them loaded with hay, or rather you see a walking hay cock, for the ass is so completely covered by the load as to be invisible; even the wood is carried upon their backs by fixing crotchet sticks upon their pack saddles. They also carry light loads in small carts; a great part of the water dealt out to the inhabitants of Paris is brought in this manner. I am satisfied that poor tradesmen in our country, and especially in the small villages, would derive great use from them, at half the expense that it costs them to keep a horse for drawing their wood, going to mill, &c. since they subsist upon almost nothing, and are satisfied to be perpetually employed.

Sheep.—The common sheep of France, I think very much resemble the sheep of New-England. The best are rather inferior to the best of New-

York, but more so in their wool than in their carcases, which are as large if not larger than ours; but the flesh of those is much less esteemed than that of the small breed of Brittany, which is extremely delicate and high flavored. All the sheep of this country are parked or housed at night, and attended by a shepherd in the day, who leads them over the commons and stubble grounds, and though there are no enclosures or any thing to separate them from gardens and sown fields, yet so vigilant are the shepherd's dogs that they never trespass, but satisfy their hunger on the coarsest food while dainties are in their view. I should except from these observations, the race of the *Merinos* or Spanish sheep which have been lately introduced, as they well deserve a very particular notice, and the rather as I have now some in our state, and I am told that a number have also been imported by Col. Humphrey; so that with a little attention we may be amply stocked with the only species that produces wool which is of sufficient fineness to make broadcloths, and who on many other accounts will claim particular attention. But as the vessel that takes this is on the point of sailing, I must defer this and a variety of other matters to the next conveyance; and the rather as I believe the society will see little in this to compensate the time that I have already detained their attention. I hope you have received my letter, together with the samples of pyrites used as a manure, since I consider that as a very important discovery, and I

believe one that is quite new in America, as indeed it appears to be in Europe, a small part of France only excepted.

I PRAY you to present me respectfully to the gentlemen of the society at large, and very particularly to my friends among them; and believe me to be, dear Sir,

With the highest esteem,
Your most ob't. humble serv't.
ROB. R. LIVINGSTON.

To Doct. DE WITT, *Sec'y. to the Agricultural Society, State of New-York.*

DESCRIPTION

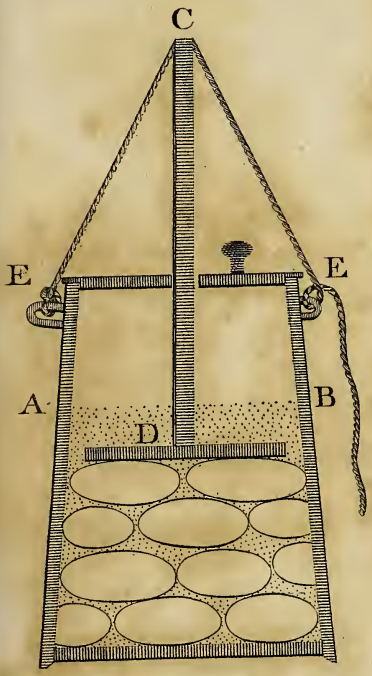
OF A CHURN ON A NEW CONSTRUCTION,

By SIMEON DE WITT.

FIGURE 1 is a section of the Churn. A B is an upright post, which may be fastened at top to a beam of the milk-room. C C are two arms mortised into the post, at such a height as to be level with the lower part of the breast of a common sized man. D is a representation, as seen from above, of one of the arms, with its tenon *a*, its open mortise *b*, to receive the churn stick, and pin *c* to confine it to its place. E F is the churn-stick. G G are two leaves of the dasher fastened to cross

Fig.

Butter Cask



Drill Churn.

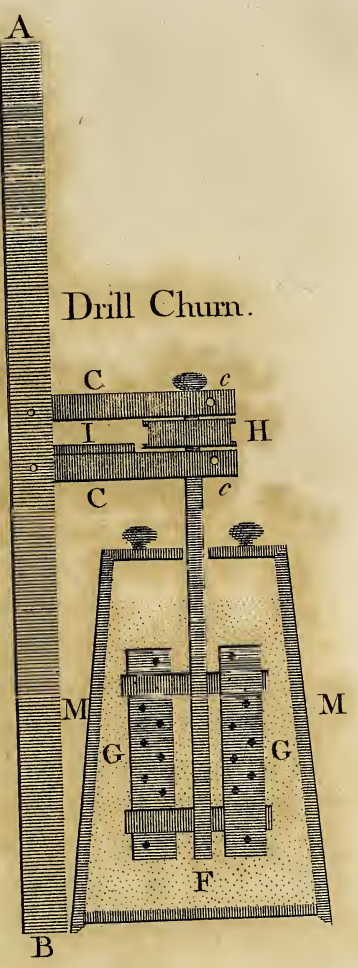
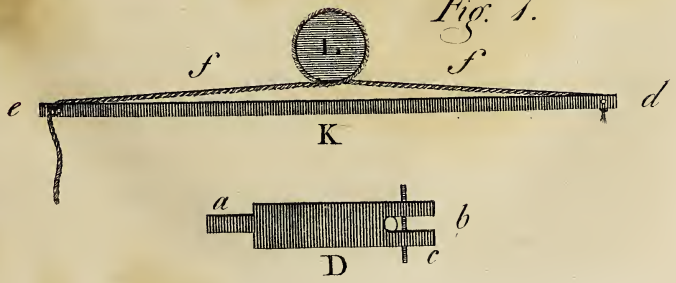


Fig. 1.



pieces passing through the churn-stick. Two others placed at right angles to these are not represented. The leaves of the dasher are perforated with holes. H is a roller fastened to the churn-stick. Its diameter is about ten inches, and its thickness about two and a half or three inches, with a flat groove in its edge. To the top of the churn-stick at E is fastened a button, by which it is suspended so as to keep the roller exactly half way between the arms C C. On the lower arm at I is fastened a strip of wood, to raise the bow stick, when used, level with the middle of the roller. K represents the bow stick, as seen from above. At *d* an open mortise is made into one of its ends, into which a cord *f f* is fixed, having a knot at its end to prevent it from slipping. The cord is then taken two turns round the roller L, and fastened to the other end of the stick, through which a pin about eight inches long is driven half way to serve as a handle in working the churn. M M is the churn made in the common form.

When the churn is to be used, it is brought near to the ends of the arms; the milk and churn-stick are then put in, and the churn shifted to its place, the churn-stick at the same time slipped into the mortises at the ends of the arms, with the roller between them, and the pins *c c* put into their holes. The bow stick is next to be passed through between the arms at I, and two turns of the cord (as already mentioned) taken round the roller, drawn tight and fastened

to the other end of the stick. The cover, which is divided into two parts through its centre, with a sufficient opening for the churn-stick to move in, is next put on. The churning is then performed by working the bow stick backwards and forwards, as is done in drilling; and from the similarity of the two operations, it will not be an improper appellation to call this by the name of the DRILL CHURN. Note—It is to be observed that although for distinction sake, the stick by which the churn is worked is called the bow stick, it does not resemble in shape the instrument of that name used in drilling, for it is to be perfectly straight. Its thickness may be about an inch and a half, and its length about five feet.

IN contriving machines for facilitating manual labor, a principal thing to be considered is the direction in which the human strength can be applied to the greatest advantage. In this churn the operation is performed by drawing and pushing in a horizontal direction at the most convenient elevation; the legs and thighs bracing the body backwards and forwards and yielding to its motions, assist the work, and very much lessen the labor of the arms. In this attitude the muscles all act to the greatest advantage; whereas in the common mode of churning, the human strength is applied in the most unfavorable manner, for it is most obvious, that to raise or depress any thing at arms length requires much more force than most other

positions, and it is nearly in that manner that the common churn is worked. A *second* consideration is to simplify the machine and save friction as much as possible, and this could not be done more effectually than by adopting the drill method of turning the churn-stick. Cogs might have been used for this purpose, but they would very considerably have added to the complexness and friction of the work, as well as to its liability to be impaired. A *third* consideration of essential importance is to what degree the power of the machine is to be multiplied; and this is to be governed entirely by the force that is to work it and the resistance to be overcome. The size of the roller has been calculated on this principle. Its circumference is about thirty inches, which is about the length of each stroke that the operator will naturally make: So that every stroke will make a complete revolution of the dasher, and throw its extremities 30 or 40 inches through the milk. It will be found also on trial that the operation is not too laborious for a person of ordinary strength, and indeed much easier than the common mode of churning. If it had been required to adapt the machine to persons possessing but half the ordinary strength of men, the diameter of the roller would have been doubled; but it is evident that then one half of the effect would have been lost, for every stroke would in such case have made only half a revolution of the dasher according to the axiom that *what is gained in power is lost in time or space.* All the use of

multiplying the powers of a machine is to bring its operations within the reach of the force to be applied: More than this will only cause a loss of time in working it. A *fourth* point to be consulted is, that no part of the power applied be wasted in producing *useless effects*. In the common mode of churning, in lifting the dasher the resistance caused by the weight of the milk above is to be overcome, in order to produce the agitation requisite for separating the butter from the milk, and in depressing the dasher it meets with equal resistance in forcing the milk from below. These are therefore effects that waste the power unnecessarily, for equal agitation can be produced without encountering such resistances, and this is done by giving the dasher a horizontal instead of a perpendicular motion. It may be supposed that if there be any milk above and below a dasher moving horizontally there will be an unequal agitation. This however will be prevented by an incidental cause; for while the churning is performing, the milk will be carried by its centrifugal motion with considerable velocity against the sides of the churn, and their direction not being at right angles to the motion of the milk, but widening below, they must necessarily reflect it somewhat downwards. The consequence is that the milk will thus be continually, though slowly, forced down by the sides and made to rise through the middle of the churn; of course, all its contents will come successively under the strokes of the dasher.

This churn has other advantages over the common kind, that have not yet been mentioned. It can be filled nearly full, and used even without a cover, and yet none of the milk will dash out of it. In these respects the other is very deficient, less neat, and considerably troublesome. When the milk is churned together with the cream, as the practice is where butter is made of the best quality and in the cleanliest manner, these advantages are of importance, as will be readily perceived without further explanation. I have now only to add, that I have superintended the construction of such a *drill churn* in a friend's dairy, and have attended to its operation; that it fully answers every purpose on which I had calculated, and that it was supposed to separate the butter from the milk more completely than the ordinary method of churning.

While on this subject, it may not be amiss to take notice of the Whip Churn. I am induced to this by finding that it is not so generally known as I had supposed it to be; for although I have known it in use from my earliest days, and now know families who have not been without it for 30 years, I have lately seen it advertised as a new invention, for which an exclusive right has been obtained by patent.

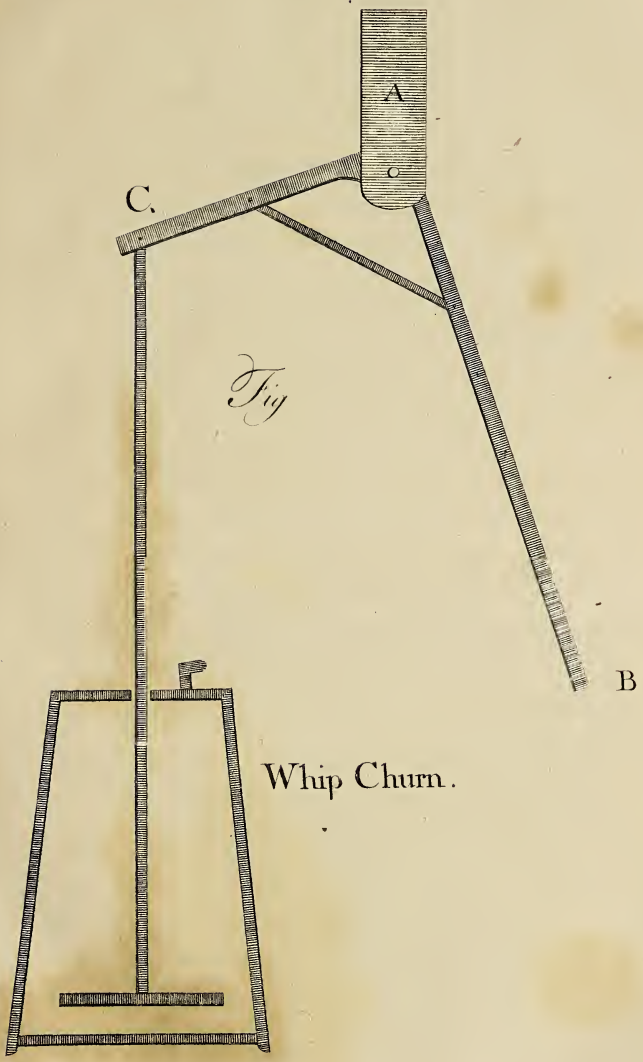
The churn, churn-stick and dasher, are in every respect of the common kind. Its distinction is derived altogether from the manner of working it,

which is contrived to be done in a horizontal instead of a perpendicular direction. Figure 2 represents such a churn. A is a piece of timber fastened to the beam of the milk-room. In a mortise in the end of it moves the whip B C. To its end *c* is connected the upper end of the churn-stick, so as to move freely on a pin driven through the mortise which is made to receive it. From this representation it is evident that by moving the end B of the whip backwards and forwards the churn-stick and dasher will be made to move up and down. All the advantage which this churn has over the common kind, is the direction in which it is worked. This, however, is amply sufficient to give it a decided preference.

HOW TO PRESERVE THE SWEETNESS OF BUTTER.

By SIMEON DE WITT.

IN cities it is extremely difficult, and often impossible to obtain regular supplies of fresh butter during the winter; it is therefore customary in most families to procure in the fall, at least for ordinary use, as much of that article, laid up in firkins, as will serve till the return of the grass season. But firkin butter, it is well known, will before spring acquire that offensive flavor which is distinguished by the term *strong*, and which ruins the taste of every article of cookery into which it



Fig

Whip Churn.

is admitted. My extreme aversion to strong butter, in whatever compounds it may be presented to the palate, has induced me to try which way it can be best preserved in its original state, and neither theory nor practice has been able to suggest a better method than to take it fresh from the dairy and keep it immersed in a strong pickle made of common salt and water, with the addition of some saltpetre to increase its anticeptic quality. My practice is, to purchase such of the fall butter, brought to market in rolls, as on trial I find to be fresh and sweet, and if the whey does not appear to be sufficiently worked out of them, I have them immediately worked over again, and their surfaces smoothly finished, and then put into the pickle. The next thing to be attended to as an essential matter, is to prevent them from coming in contact with the air, which they will necessarily do by their own buoyancy, if care be not taken to guard against it. How to do this may appear too simple to require particular directions, but on trial it will be found otherwise. The first method I took, was to load a circular board, laid on the rolls, with weights attached to it, and to fasten the ends of three cords to its edge, equi-distant from each other, and join their other ends to a piece of wood, to serve as a float as well as handle. But I soon found that this circular board, with its weights, would frequently tilt and sink down edgewise in the cask, owing to the unequal pressure of the rolls upwards. In order to rid myself of this inconvenience, as well as of the trouble of lifting these

weights whenever butter was to be taken out, I had a vessel constructed with an apparatus in the following manner :

A B (Fig. 3.) is a cask, to which a cover is fitted, with a hole through the middle to receive a round stick C D, the lower end of which is strongly fastened into the centre of a circular board of such diameter as to pass freely into the cask. E, E, are two staples, to one of which the end of a cord is tied, then carried over a notch in the end of the stick at C, and taken through the other staple, where, after having pressed the stick hard down, to sink the butter below the pickle, it is made fast. As salt in a state of solution cannot penetrate the oily substance of butter, the pickle may, without injury, be made of any degree of strength ; and it will be of service to clarify it by breaking a few eggs in it, simmering it on the fire, and clearing away the scum as it rises.

This method of preserving butter is not only useful in private families, but may be extremely serviceable to country merchants, who are in a measure under the necessity of purchasing this article, as well as others that are from time to time brought in, for sale, or to discharge debts. I have been told by one of my acquaintance, that by thus taking the butter of his customers, and collecting it in vessels of strong brine till he found it convenient to pack it in firkins for market, its superior quality did not fail to procure it a ready sale.

ON CIDER.

By the Rererend JOHN B. JOHNSON.

THE art of making Cider is, in our country, little attended to; and, I am persuaded, little understood. It is well known that we have many sorts of apples, some of which are remarkable for a fine delicious taste, and others for an aromatic flavor. This assuredly indicates that they are possessed of a juice, which, under the management of adequate knowledge, might be made a fine bodied, wholesome, and pleasant liquor. That the cider which is generally brought to our markets, is of an opposite quality, every one knows. It is neither agreeable to the palate, nor, I presume, from its early acidity, salutary to the stomach. If it be not an important article for exportation, yet as it is in very general use throughout our country, and especially among the great body of our farmers, it presents itself as an object of attention, and deserves every exertion for its improvement. That it is susceptible of great improvement, generally, is obvious, from the perfection to which it has been brought by the farmers of Newark; and will farther appear from the following fact: In England, a certain farmer has, of late years, made cider of such an excellent quality, that it might be said to rival the nectar of the grape; and actually sold for the enormous sum of 60 guineas, or $280 a hogshead. This singular fact is mentioned in one of our public prints, and first

drew my attention particularly to this subject; but the process by which this summit of perfection was reached, was not detailed. However, if we are not possessed of the knowledge requisite to reach this high degree of excellence, every one, who has independence of mind enough to think for himself, must be convinced that the general practice of manufacturing cider in this state is notoriously absurd. What then is the process, which our farmers generally adopt? In almost any period of autumn, apples of all tastes, sweet, tart, sour—of all sorts, from the aromatic spitzenberg to the acrid crab—of every condition, unripe, mature, mellow, sound, knotted, rotten, depending from the branch or mouldering on the ground, are all gathered together; and, as though they had not already contracted impurity enough, and a sufficiency of the "discordia semina rerum" irreconcileable principles, they are heaped into one huge mass, to ferment and rot, for a period of time, which conveniency, or perhaps chance, may prescribe. Here they are exposed to sun-shine and dew, to heat and cold, to all sorts of weather, and actually sweat themselves into insipidity; or, if you may judge by the fine savor with which they salute the olfactory nerves, as you approach the cider-press, into acidity. In this delicious state, the rotten and the sound are mashed under the wheel, or ground in the mill, and pressed together, mingle, with reluctant concord, their contrary juices. The must, or juice which flows from the press, is poured into casks not always sweetened with the utmost

care. Here it is suffered to undergo a fermentation regulated by no rules, until the pomace which, during the fermenting process was cast up to the surface, has been suffered gradually to subside, with all the additional acidity acquired by its exposure to the air; and to diffuse, as it descends, its obnoxious taint throughout the whole body of the fluid—And then, behold! you have cider. Now, whatever may be the right method, this must be downright wrong. It is taking pains to abuse the bounties of a kind Providence. It may be called the art, not of making, but of spoiling cider. Any plan of operation that varies greatly from this must hold out something like the hope of success, and encourage us with, at least, the plausible promise of doing better. Suffer me then to offer, what reason appears to suggest on this subject; and also to express a hope, that those members of the Society, who can pluck the fruit, and walk beneath the shade of their own orchards, will, at the very next season, make some experiments, in order to correct or improve the method of making cider, which I now proceed to prescribe and recommend.

In order to manufacture the first rate cider, let the apples be chosen at that period when they are perfectly ripe, but before they begin to degenerate into mellowness; and let those be refused which have fallen to the earth, which are knotty, or in the least degree rotten. Those which are thus refused may serve for a bad cider, such as we now drink. They

should then be laid up together in a place, where neither the sun by day may exhale, nor the dews by night alloy, their delicious fragrance. In this state they will soon begin to perspire—that is, they will throw off those juices which most easily ferment, and by that mean get rid of the lighter, and perhaps more crude particles, the retention of which would probably prevent the general mass of the expressed juice from acquiring such a good body as might otherwise be expected; and assimilating it to the lighter wines, would effectually prevent it from attaining the first degree of excellence. Here I would remark, that the people of Devonshire, in England, prepare their apples for the press by laying them in heaps in an open part of the orchard, having found that under cover, they sustained, by excessive sweating, the loss of a great proportion of their juices, and were reduced to one half their weight, though I am persuaded that the evil complained of, arose from suffering them to remain too long in that confined and warm situation, and affords no argument against the practice of keeping them under roof. A very little experience will enable us to ascertain how long they should be kept in this state. After they have thrown out the degree of moisture which may be deemed requisite, and which may probably be effected in three or four days, they should be exposed a while to the air and sun, before they are ground, in order that the fermented vapor which covers their superficies may escape, and leave the fruit perfectly dry. Now they are ready to be ground, and should be

immediately put into the mill, which should, if possible, be so close set as to break the seeds of the apple. For these, it is well known, contain an agreeable bitter, and would communicate to the must a certain taste which could not fail to be extremely grateful to the palate. The vessels which receive the must should be so perfectly clean as to emit no kind of odor. Merely to rinse them with water is not always sufficient. It is indispensable, in order to procure the best cider, that the cask in which it is put, either to ferment or to preserve, be perfectly sweet, otherwise the very best must will turn out an indifferent liquor. The manufacturers of wine take immense pains with their casks, and if I mistake not, begin the operation of cleansing them many months before the time of vintage. Some of them burn a match in the cask just before the must is poured into it. The best method of cleansing vessels, so as to leave the liquor free from any unnatural or adventitious taste, may perhaps be known to some gentlemen of the Society; if so, they will see the necessity of communicating it, in order that nothing may be wanting to ensure the success contemplated. [See Note, at the end.]

Having now filled the casks with the new must, as it ran from the press, you approach the very crisis, the most difficult part of the whole process, that is, the period of fermentation. How long this should be suffered to continue, before the cask is closed tight, and the liquor secured from all external air,

good observation will be able better to ascertain from nice and repeated experiments, than any directions which I am now able to give. This I presume will be admitted as a sound principle, that while on the one hand, an incomplete or too short fermentation, must suffer the cider to retain too much acid, and what may be called irritable matter; on the other hand, excessive fermentation must leave a light and weak bodied liquor, similar to the poorer sorts of wine; and if the pomace be suffered to descend again, which it will do when the fermenting process is over, the two evils of weakness and sourness will, by uniting their bad qualities, inevitably spoil the finest must which can be pressed from the apple. The common practice with us is, to let the fermentation take its own course, and throw off from the cider all the spirit it can; and after it has subsided, to let the crude and acid substances which adhere to the pomace, sink down with it in the very liquor, which, by its own native efforts, had meant to throw off all foul and disgusting matter. The whole process is begun and finished in the same vessel. But, would it not be more reasonable to observe that point of time when the fermentation is beginning to cease, and before the pomace descends, to rack off into a sweet cask about four fifths of the liquor, now considerably purified, and to close it tight from the operation of all external air? Thus, what nature meant to expel, will have escaped; and no new evil quality, derived from the acid substances which cover the surface of the fermented liquor, will be admitted or

retained. A gallon or two of brandy, is sometimes added to a hogshead of wine ; perhaps this might improve the body, and also the taste of cider. It is remarked by some that the juice which flows about the middle of the pressing process, makes the most excellent liquor. It would then be prudent to refuse a certain proportion at the commencement and at the close of this operation, and preserve it for a more common drink.

In these observations I may not be perfectly correct : improvement must be expected from repeated experiments, faithfully made and accurately noted.

A further mean of improvement, which ought to be suggested, is this—to separate the different species or varieties of the apple, and learn what degrees of excellence, each possesses with respect to this domestic manufacture. An additional reason for this, is, that they are not only of different tastes, but ripen at different periods. If kept separate, it will easily be perceived that we would have cider, as well as wines, of various name. The spirited champaign might be rivalled by the sparkling pearmain—the sweet malaga, by the delicious redstreak ;* sherry, perhaps even madeira, by the aromatic spitzenberg ; and old hock yield its honors to the acidulated juice of the crab apple.

* An apple at Newtown Long Island—remarkably sweet.

NOTE.

METHOD OF CLEANSING CASKS, COMMUNICATED

By EZRA L'HOMMEDIEU, Vice-President of the Society.

TAKE, for a barrel, one pint at least, of unslaked lime; put it in the barrel; pour in a considerable quantity, two or three gallons, of hot water; bung the barrel, and shake it. While the lime is slaking observe, occasionally, to give it vent, lest the barrel should burst. Let it stand in till cooled, and then rinse the barrel with cold water; it will be perfectly sweet for use.

ANOTHER METHOD, COMMUNICATED

By Mr. VAN DER VEER, of Kings county.

TAKE, for a barrel, half a bushel of hickory-nut leaves, gathered from the tree—boil them in 2 or 3 pails of water—after boiling $\frac{1}{2}$ or $\frac{3}{4}$ of an hour, pour the water and the leaves into the barrel; bung it up close, and let it stand over night. In the morning rinse out the barrel with cold water, and it is fit for use. Note.—The former method communicates no taste to the cider; the latter gives it a taste and flavor which is extremely agreeable to some.

AN ESSAY,

SUGGESTING A PLAN TO INTRODUCE UNIFORMITY IN THE WEIGHTS AND MEASURES OF THE UNITED STATES OF AMERICA.

By PHILIP SCHUYLER, Esquire.

TO introduce an uniform system of measures and weights, that shall prevail in the several communities composing a nation, it seems essential that the deductions should be made from a standard the least variable; that it should embrace properties, by means whereof, the measures and weights to be derived therefrom, may with facility, and certainty, be communicated to other nations, with whom commercial intercourse prevails, to enable such other nations to compare and estimate their measures and weights with those of the nation who has deduced them from the standard.

THAT as the nation, where such uniformity is to be established, must be supposed, already to have measures and weights, the deductions from the standard should be such, as that the old measures and weights may easily be compared with and estimated in the new; that the new should retain, as far as possible, the denominations of the old, and approximate, as nearly as may be, to the length, capacity and weight of the latter.

SIR Isaac Newton, and many others, both prior, and subsequent to the period in which he wrote,

down to Mr. Jefferson, late secretary of state, who has treated the subject in question, in a report to congress, all agree in opinion, "that matter by its mere extension furnishes nothing invariable," and that recourse must therefore be had to its motion. That a pendulum vibrating seconds of time, in any place, in any given latitude, will be of the same length, in the same latitude, in any other place, however remote the two places may be from each other, provided it vibrates in places on the level of the ocean; and that "such a pendulum, becomes itself a measure of determinate length, to which all others may be referred, as to a standard."

But as the center of oscillation, in a pendulum with a bob, is not susceptible of accurate determination, several writers on this subject have proposed as a substitute for such a pendulum, a rod without a bob, particularly the ingenious Mr. Graham, who in 1721, so constructed a rod, that neither the extension of the metal, of which it was constructed, occasioned by heat, or its contraction from cold, had any perceptable effect on its length, and he found that it vibrated seconds for a very long time without any sensible error.

Having premised thus much, the following deductions will be made from an uniform cylindrical rod, that shall vibrate seconds of time, on the level of the ocean, and in the completion of the forty-fifth degree of latitude; for

although both the rod, and the pendulum with a bob, may be divided into such equal parts, that a given number of those parts, shall approximate the length of the common or English foot, within less than the 10000th part of an inch, yet the former is preferable, as a standard, because it is susceptible of more correct mechanical division than the latter.

Sir Isaac Newton's computation of the length of a pendulum, to vibrate seconds of time at the completion of the 45th degree of latitude, as stated by Mr. Jefferson, is 39. 14912 inches English measure, and as a rod, to vibrate seconds in the same latitude, must be one half longer than the pendulum, the length of such a rod will be 58. 72368 inches English measure. If this rod be divided into 587 $\frac{1}{5}$ equal parts, as Mr. Jefferson proposes, in that part of his report, where he supposes the present measures of length might be retained for the United States, each part will be so very nearly one tenth of an English inch, that 120 of these parts, will not exceed the English foot in length, more than the 1330th part of an inch ; but in that part of his report, where he supposed a decimal series in measures of length, capacity and weights might prevail, he proposes a division of the rod, into five equal parts, and that one of these parts should be deemed the American foot, or unit, from whence our measures of length and capacity should be deduced, such a foot would be equal to 11. 744736 inches English measure, and the American inch would be

equal to 1. 1744736 English inches, but if one fifth of the rod should be established as the length of the American foot, the appendix to Mr. Jefferson's report shews, that there cannot in a single instance, be a coincidence between the old and the new measures of length, capacity or weights, in the decimal series, and it is evident, that whenever a conversion of the old, into the new measures, and visa versa, becomes requisite, such large factors must be employed as will render the operation exceedingly lengthy and laborious, even where the area of a superficies only, is to be converted from the one to the other admeasurement, and much more so, when the cube is concerned, as it must necessarily be in all measures of capacity. It seems therefore of some considerable importance, to take such a portion of the rod, for the standard unit, of the new measures, as shall forego the necessity of such large factors, by a division of the rod, which may be performed with more accuracy than that proposed, to wit: into $587\frac{1}{5}$ equal parts, or into 5 equal parts.

Let then the rod be divided into 23 equal parts, let one of these parts be subdivided into ten equal parts, then will four of the 23 equal parts and 7 tenths of another, so nearly approximate to the English foot, as that the excess will be only about the 18000th part of an inch, a difference so extremely minute as not to be perceptable to sense; but if this fractional excess, minute as it is, should

be deemed worthy of attention, it may be rendered of still less moment, by taking a rod, which shall vibrate seconds of time, in the latitude of 44 degrees 56 minutes and 4 seconds, which divided as above mentioned the 4 7-10th parts will not exceed the English foot, more than 2,000,000th part of an inch.

Let then these 4 and 7 tenths part of the rod, when divided into 23 equal parts, be called the standard unit, or American foot, and this foot, divided into ten equal parts, each part to be denominated the American or standard inch, and each inch into ten other equal parts to be called lines, and each line into ten other equal parts to be called points, and to be the least measure of length, and then we may have a series as in the following table for

MEASURES OF LENGTH.

Points.	*Lines.*	*Inches.*	*Feet.*	*Yards.*	*Fathoms.*	*Perches.*	*Chains.*	*Furlongs.*	*Mile.*	*Comparative value.*
1										10 new equal to 12 old points.
10	1									10 Do. to 12 old lines.
100	10	1								10 Do. to 12 old inches.
1000	100	10	1							The new equal to the old foot.
3000	300	30	3	1						The new equal to the old yard.
6000	600	60	6	2	1					Do. to old fathom.
16500	1650	165	$16\frac{1}{2}$	$5\frac{1}{2}$	$2\frac{3}{4}$	1				Do. to old perch.
66000	6600	660	66	22	11	4	1			Do. to old chain.
660000	66000	6600	660	220	110	40	10	1		Do. to old furlong.
5280000	528000	52800	5280	1760	880	320	80	8	1	Do. to old mile.

SUPERFICIAL MEASURE,

MAY be estimated either duodecimally, or where the sides are measured in feet and parts of a foot, decimally; if in the latter, the area will be expressed in feet and decimal parts of a foot, instead of being expressed in feet, inches, primes and seconds &c. and when requisite the decimal parts of the foot, may be converted into duodecimals by constantly multiplying such decimal parts by 12, and the result will be old inches, primes, &c.

THERE will be no alteration in land measure, which may either be decimally expressed, in square chains and decimal parts of a chain, or reduced as now usual, to acres, roods, perches, and parts of a perch; for the chain will still continue to be sixty-six feet in length, divided into 100 links, of the same length as the present link; for 6 new inches and $\frac{6}{10}$ths are precisely equal to 7 old inches and $\frac{92}{100}$ of an inch.

CUBIC MEASURE, OR MEASURES OF CAPACITY.

LET the unit of measures of capacity be the present Winchester bushel of 2150.4 cubic English inches, equal to $1244\frac{36}{61}$ new or standard inches, and let the least measure be a metre, or cube of one new inch, and let the series be as in the following

TABLE.

Metres.	*Gills.*	*Half Pints.*	*Pints.*	*Quarts.*	*Half Gallons.*	*Gallons.*	*Half Pecks.*	*Pecks.*	*Half Bushels.*	*Bushels.*	*Diameter and depth of each vessel, as cylinders, in standard inches and decimal parts.*
1											*Diameter* 1 *Depth* 1.27
4 $\frac{26}{81}$	1										1.5 2.5
8 $\frac{52}{81}$	2	1									2.1 2.5
17 $\frac{23}{81}$	4	2	1								2.71 3
34 $\frac{46}{81}$	8	4	2	1							3.32 4
69 $\frac{11}{81}$	16	8	4	2	1						4.2 5
138 $\frac{22}{81}$	32	16	8	4	2	1					5.42 6
155 $\frac{45}{81}$	36	18	9	$4\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{1}{8}$	1				6.3 5
311 $\frac{9}{81}$	72	36	18	9	$4\frac{1}{2}$	$2\frac{1}{4}$	2	1			7.8 6.51
622 $\frac{18}{81}$	144	72	36	18	9	$4\frac{1}{2}$	4	2	1		11.5 6
1244 $\frac{36}{81}$	288	144	72	36	18	9	8	4	2	1	15 7.0422

In the above series, the bushel, half bushel, peck and half peck, will be the same as the present, deduced from the Winchester bushel; and hence no variation in what may properly be called dry measure.

The present wine gallon contains 231 cubic inches, English measure, which is equal to 133 $\frac{49}{72}$ cubic new, or standard inches; and as the gallon, in the above series, is the one-ninth of a bushel, it will contain 138 $\frac{22}{31}$ standard cubic inches, which exceeds the present gallon by a little more than 4 cubic inches, or nearly a gill; or more correctly 3465 new or standard gallons, of nine, to the bushel, are equal to 3584 of the present wine gallons; and the same proportion holds, in all the measures below the gallon, to the gill inclusive. Dealers in spirits and wines will therefore readily compute the value, and compare it with the old.

It having been found, by most accurate experiment, that an English cubic foot of pure rain water weighs precisely one thousand ounces avoirdupois; and as the standard or American foot will be the same as the English, but divided into ten inches, the cubic foot will consist of one thousand standard cubic inches; and thus one standard cubic inch of pure rain water will precisely weigh one avoirdupois ounce; and as the avoirdupois weight will prevail in the series of new weights, herein after mentioned, it is evident that those who have measures

of capacity, and have no weights, may, by means of the former, determine the weight of any commodity. Thus, if I place on one scale the water that will fill a gallon, and counterpoise it by the commodity to be weighed, I immediately know that the commodity weighs 138 $\frac{2\,2}{8\,1}$ ounces avoirdupois, or eight pounds 10 ounces $\frac{2\,2}{8\,1}$ parts of an ounce; and thus those, who have weights but no measures, may, by means of the former, determine the contents of the gallon or other measures of capacity; thus, if I wanted to measure a gallon of wine, I place in one scale 8 pounds 10 ounces and $\frac{2\,2}{8\,1}$ parts of an ounce, and counterpoise with wine in the other scale, which will then be a gallon, except the very minute difference between the specific gravity of wine and pure rain water.

WEIGHTS.

Since a standard cubic inch, of pure rain water, weighs precisely one ounce, let an inch of standard measure cubed, and filled with pure rain water, be the unit of weights, that is, one ounce avoirdupois, and let a droit be the least weight, and then we may have a series for weights, as in the following

TABLE.

Droits.	*Mites.*	*Grains.*	*Pennyweights.*	*Ounces.*	*Pounds.*	*Quarters.*	*Hundreds.*	*Tons.*	*Comparative value between the old and new weights.*
1									The new the same as the old droit.
24	1								Do. mite.
480	20	1							Do. grain.
12000	500	25	1						24 new equal to 25 old pennyweights.
210000	8750	437½	17½	1					The new ounce the same as the old.
3360000	140000	7000	280	16	1				Do. do. pound.
94080000	3920000	196000	7840	448	28	1			Do. do. quarter.
376320000	15680000	784000	31360	1792	112	4	1		Do. do. hundred.
7526400000	31360000	15680000	627200	35840	2240	80	20	1	Do. do. ton.

Coins, precious stones, gold, silver and medicines, are perhaps the only articles to which troy weight has been applied, and as the ounce troy contains 480 grains, and the avoirdupois ounce $437\frac{1}{2}$ grains, or the former to the latter as 192 to 175, the dealers, in the articles above mentioned, may readily estimate their value in the new weights. Merchants, grocers and others make use of the avoirdupois weight in all the denominations of an ounce and upwards, and these being equal to the present weights, of the same denomination, no inconvenience can result.

But if it should be judged more eligible, that a decimal series should prevail in the American measures of length, capacity, weight and coins, we must still have recourse to the pendulum, as a standard, from which to deduce the series, and as before by dividing the rod into 23 equal parts, and taking 4 and $\frac{7}{10}$ths of these parts, as the unit of long measure, or American foot, we may have a series, as in the following table for

MEASURES OF LENGTH,

In which a point is the least measure of length, and a mile the greatest.

Points.	*Lines.*	*Inches.*	*Feet.*	*Yards.*	*Perches.*	*Furlongs.*	*Mile.*	*Comparative value between the new or standard measures of length and those now in use.*
1								10 standard, equal to 12 old points.
10	1							10 do. to 12 do. lines.
100	10	1						10 do. to 12 do. inches.
1000	100	10	1					The new or standard the same as the old foot.
10000	1000	100	10	1				3 new or standard, equal to 10 old yards
100000	10000	1000	100	10	1			33 new, equal to 200 old perches.
1000000	100000	10000	1000	100	10	1		33 new, equal to 50 old furlongs.
10000000	1000000	100000	10000	1000	100	10	1	66 new, equal to 125 old miles.

FURTHER comparison between the new and old measures :

30 new inches equal to the old yard.

37 $\frac{1}{2}$ new inches equal to the English ell of 45 inches English.

22 $\frac{1}{2}$ new inches equal to the Flemish ell of 27 inches English.

100 new feet, or a new perch, equal to 6 old perches and 1 foot.

1000 new feet, or a new furlong, equal to 1 old furlong, 20 old perches and 10 feet.

10000 new feet, or a new mile, equal to 1 old mile, 7 old furlongs, 6 old perches and 1 foot.

SUPERFICIAL MEASURE,

WILL continue to be estimated in squares of the measure of length, if the sides are given in inches, lines and points, the product will be square inches, lines, points and decimal parts of a point ; and multiplying the product by 1.44, the result will be old inches, lines, points, &c. and the lines and points, &c. may be converted to the duodecimal denomination of primes, seconds, thirds, &c. by constantly multiplying by 12.

IF the sides are given in feet, the product or area, will be the same in the new as in the old.

IF the sides are given in feet, inches, lines, &c. the feet part of the product will be indifferently old

or new feet, and the inches, lines, &c. may be converted into old inches, primes, &c. by constantly multiplying by 12.

LAND MEASURE.

The present land measure being made by a chain decimally divided, may continue to be measured as it now is, by a chain of 66 feet divided into 100 links, each link being $6\frac{6}{10}$ standard inches long, which is $7\frac{92}{100}$ inches old measure, the present length of the link, and the area may be expressed in square chains, and decimal parts of a chain, and may be converted into acres, roods and perches, as now customary.

CUBIC MEASURE OR MEASURES OF CAPACITY.

Let the standard unit or foot cubed, be called a bushel, and a pint the least measure of capacity, and let the series be as in the following

TABLE.

Pints.	*Quarts.*	*Gallons.*	*Bushels.*	*Quarters.*	*Last.*	*Comparison between the new or standard measure and the old of the same denomination.*
1						9625 new equal to 576 old or nearly 16 $\frac{3}{4}$ new to 1 old pint.
10	1					1925 new equal to 576 old or nearly 3 $\frac{1}{3}$ new to 1 old quart.
100	10	1				385 new equal to 288 old wine gallon or nearly 1 $\frac{1}{3}$ new to 1 old, or 14 new equal to 9 old corn gals.
1000	100	10	1			56 new equal to 45 old Winchester bushels.
10000	1000	100	10	1		224 new equal to 225 old quarters.
100000	10000	1000	100	10	1	224 new equal to 225 old lasts.

WEIGHTS.

Let the weight of a standard cubic inch of rain water, which is equal to 1 ounce avoirdupois, be the unit of weights, and then we may have a series, as in the following table, in which a droit is the least weight, and progressing decimally to a ton, as the greatest weight.

TABLE.

10000000	1000000	100000	10000	1000	100	10	1	*Droits.*
10000000	1000000	100000	10000	1000	100	10	1	*Mites.*
10000000	1000000	100000	10000	1000	100	10	1	*Grains.*
1000000	100000	10000	1000	100	10	1		*Penny-weights.*
100000	10000	1000	100	10	1			*Ounces.*
10000	1000	100	10	1				*Pounds.*
1000	100	10	1					*Stones.*
100	10	1						*Hundreds.*
10	1							*Ton.*
1								

Comparative value between the above standard weights and those in present use of the same denomination.

Droit—1 new equal to 21 old droits troyweight.

Mite—4 new equal to 35 old mites, Do. or 1 new equal to $8\frac{3}{4}$ old.

Grain—8 new equal to 35 old grains, Do. or 1 new equal to $4\frac{1}{8}$ old.

Pennyweight—96 new equal to 175 old, Do. or 1 new equal to $1\frac{79}{96}$ old.

Ounce—the new equal to the old avoirdupois ounce.

Pound—16 new equal to 10 old pounds, or $1\frac{3}{5}$ new equal to 1 old avoirdupois pound.

Hundred—224 new equal to 125 old hundreds of 112 lb. avoirdupois.

Ton—448 new equal to 125 old tons of 20 hundred avoirdupois.

The new or standard weights compared with apothecaries weight.

Grains—32 new or standard Grains equal to 7 scruples troyweight.

Pennyweight—48 standard pennyweights equal to 35 drams.

Ounce—192 standard ounces equal to 175 troy ounces.

Pounds—1152 new or standard pounds, equal to 875 troy pounds.

COINS.

If the value of the coin of the United States should be deduced from the standard of measure of length, capacity and weights, proposed in the foregoing decimal series, then, instead of an unit, composed of 371,25 troy grains of pure silver and 44,75 grains of alloy, the new unit might be 91 $\frac{2}{3}$ new or standard grains of pure silver and 8 $\frac{1}{3}$ grains of alloy, it would then be precisely of the weight of one cubic standard inch of water, and the alloy would be precisely one-eleventh of the weight of the pure silver, and the value of this new unit or dollar would be equal to 108 cents 02469 &c. parts of a cent of the present dollar; but as the excess above 108 cents would create much labor in converting the present currency of the several states to this new currency, and vice versa, and as that excess is of too much value to be slighted, let therefore the value of the new unit be equal in value to 108 cents of the present unit or dollar, then the pure silver in it would be 91 $\frac{9}{12}$ new standard grains and 8 $\frac{5}{12}$ new or standard grains of alloy, instead of 8 $\frac{1}{3}$; and thus, with the diminution of $\frac{1}{12}$ of a new grain of pure silver and the addition of $\frac{1}{12}$ of a grain of alloy, we should have an unit weighing precisely one ounce standard, and to consist of 100 cents, equal in value to 108 of the present cents; and the value of this unit, compared with the value of the present dollar and the state currency, would stand as follows, 25 of the proposed units equal to 27 of the present dollars.

Where Dollars are valued at					
8s.	125	proposed units will be equal to	£54,	or multiply the unit by	0.432.
7s6.	200	do.	£81,	do.	0.405.
6s.	250	do.	£81,	do.	0.324.
5s.	100	do.	£27,	do.	0.27.
4s8.	250	do.	£63,	do.	0.252.
4s6.	1000	do.	£243,	do.	0.243.

A golden unit, of equal value with the proposed silver one, will contain of pure gold 6 grains, 1 mite and 1 droit standard and one eleventh part of alloy, or 5 mites and 5 droits alloy, making the whole weigh 6 grains, 6 mites, 6 $\frac{2}{3}$ droits standard weight, equal to 29 $\frac{1}{6}$ troy grains, equal to one-fifteenth of the weight of one cubic standard inch of rain water; hence 400 grains, 19 mites troy, of pure gold, and 36 grains 11 mites of alloy, making together 437 grains and 10 mites troy, will precisely make 15 golden units of the value of 108 cents of the present dollar.

As it is possible that some who may peruse this essay will not easily comprehend how the measures of one nation can be communicated to another, by means of the pendulum or pendulum rod, I shall therefore explain it.

Let us suppose, that the pendulum rod, vibrating seconds of time in the 45th degree of latitude, be made the standard from whence the American measures are deduced, the length of this rod, in the new or standard inches, proposed in this essay, is 48.9364 such inches, and divided into 23 equal parts, 4,7 of these parts will be 10 inches, or the

American foot; and a rod of 10 such inches will vibrate 132.73 times in the time that the second pendulum makes 60 vibrations.

If then, a French mathematician is informed that the American foot is divided into 10 inches, and that a rod of the length of that foot will make 132,73 vibrations in the same time that a second pendulum makes 60 vibrations, he will immediately know, that the time of a single vibration in each must be inversely, as those numbers, and that the length of those pendulums were as the squares of the times, hence he would have the following equation:

As the square of 132.73 to the square of 60, so is the length of the pendulum rod vibrating seconds in the 45th degree of latitude, in French measure, to the length of the American foot in French measure. If this length should be found 11.25 inches French measure, he would know that the American foot was equal to 11.25 French inches, and consequently 15 French feet equal to 16 American feet.

Or, if a French mathematician should be informed that if the length of a pendulum rod, vibrating seconds of time in the 45th degree of latitude, was divided into 23 equal parts, 4.7 of these parts would make the American foot, he would find the length of such a rod in French measure, and dividing it into 23 equal parts, and taking 4.7 of such parts he would find the length of the Ame-

rican foot in French measure, as before, 11.25 inches.

If it was certain, that we had true avoirdupois weights in America, we might find the length of the English foot by means of such weights and of pure rain water, supposing a cubic foot of such water to weigh precisely 1000 ounces, thus :

Let a cubic vessel of capacity be constructed, of any dimensions at pleasure, the longer the better, for instance, let its sides be, at guess somewhere between a foot and a yard, let its inside be either lined with metal or varnished, to prevent its absorbing water ; placing such a vessel perfectly horizontal, then correctly weigh any quantity of water, and pour it in the vessel, having done this, mark the depth of the water on a plain brass ruler, and divide the depth on the ruler into 1000 equal parts, and then the length of the foot may be found by the following analogy :

As the weight of water, in Avoirdupois ounces, to the weight of water, in an English cubic foot, so is the cube of the parts, into which the ruler is divided, to the cube of the parts which will be equal in length to an English foot.

Example.

Suppose the water contained in the vessel to weigh 15625 avoirdupois ounces ; then, as 15625

avoirdupois ounces is to 1000 ounces, the weight of water in a cubic foot, so is the cube of the parts, into which the ruler is divided, (to wit. 1,000,000,000) to the cube of the parts which will make a foot in length, that is as

15625 to 1000, so is 1000000000 to 1000

15625)1000000000000(64000000, the cube root.
93750
62500
625 0

of which is 400; and thus, 400 of the parts, into which the ruler is divided, is precisely one English or standard foot; and this may be thus proved:

As the vessel contains 15625 ounces of water, or 15625 cubic inches, if an ounce can be contained in a cubic inch, then the side of such a vessel must necessarily be 25 inches, that being the cube root of 15625, the solid contents of the water in the vessel; but 25 inches are to 10 standard inches, the length of an English foot, as the cube of 10 or 1000 is to 400; and hence, it results, that if all our weights were lost, but any standard of the measures of length retained, we should be able to make new weights; and hence it appears also, that as the cube root of any given weight of water in avoirdupois ounces, contained in any cubic vessel, is to 10, the new inches in a foot, so is 1000 to the number of parts when the interior side of such vessel is divided into 1000 parts.

But as troy weight is known and used in most, if not all, the European states, the length of our foot may be determined by means of that weight and pure water, as well as from the avoirdupois weight; for, since 480 grains troy make a troy ounce, and 437.5 grains troy make an avoirdupois ounce, and the troy pound having only 12 ounces troy, and the avoirdupois pound 16 ounces avoirdupois, it follows, that 144 pounds avoirdupois is equal to 175 pounds troy; and since a cubic foot of water contains 1000 ounces avoirdupois or 62.5 pounds avoirdupois; then, as 144 to 175, so is 62.5 to 75.95486111, the pounds troy in a cubic foot, and then we may have the following analogy:

As the weight of water in troy pounds, to fill any cubic vessel, is to 75.95486111 troy pounds, the weight of water in a cubic foot, so is the cube of the parts, in which the interior side of the vessel is divided, to the cube of the parts making a foot, the cube root of which will be the number of parts taken from the side of the vessel, which shall be equal in length to a foot.

And a Frenchman may also compare the American foot with the French foot by means of troy weight and pure water; for, if he should find that a cube of a French foot, being filled with water, the water will weigh 92.181 pounds troy, and be informed that 75,95486111 pounds troy of water are contained in a cube of an American foot, he will have the following analogy:

As 75.95486111 is to 92.181, the pounds troy in a cube of a French foot, so is the cube of 1000, the parts in which he would divide the vessel, to 1213629622, the cube of the parts contained in a French foot, the cube root whereof is 1066.666; and as 1000 to 1066.66, so is 15 to 16, and thus he would know that 15 French are equal to 16 American feet.

If instead of cylindrical vessels of capacity it should be deemed convenient to substitute vessels with either square bottoms or paralelograms and with sides at right angles to the planes of the bottoms, then the interior of the bottom, and height of the sides for the bushel and its subdivisions, and the wine gallon and its subdivisions, may be as in the following table. The bushel contains 2150 cubic inches and $\frac{2}{5}$, and the wine gallon 231 cubic inches.

TABLE.

Names of the Measures.	Contents in cubic inches.	Length in inches.	Breadth in inches.	Height in inches.
Bushel	2150 2/5	16	16	8 2/5
Half bushel	1075 1/5	12	11 1/5	8
Peck	537 3/5	11 1/5	8	6
Corn Gallon	268 4/5	8	6	5 3/5
Half Gallon	134 2/5	5 3/5	4	6
Quart	67 1/5	4	3	5 3/5
Pint	33 3/5	4	3	2 4/5
Half pint	16 4/5	3	2	2 4/5
Gill	8 2/5	2	1 1/2	2 4/5
Wine gallon	231	6	5 1/2	7
Wine half gallon	115 1/2	6	3 1/2	5 1/2
Wine quart	57 3/4	3 1/2	3	5 1/2
Wine pint	28 7/8	3	2 3/4	3 1/2
Wine half pint	14 7/16	3	2 3/4	1 3/4
Wine gill	7 7/32	2 3/4	1 3/4	1 1/2

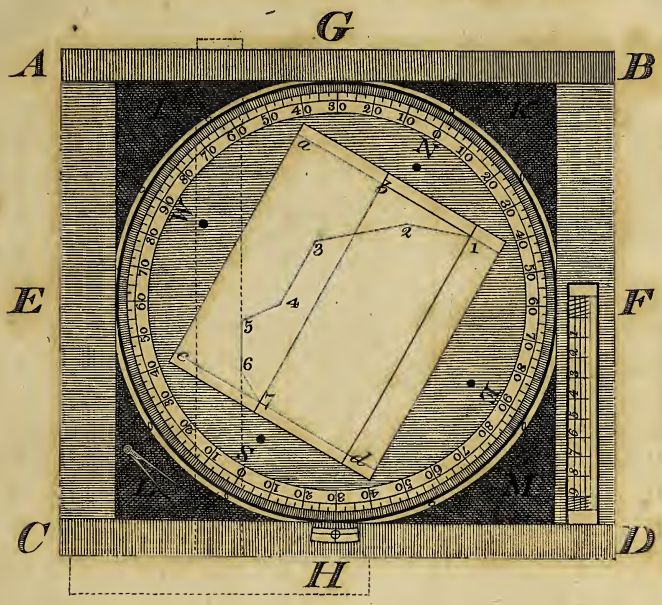
DESCRIPTION

OF AN OFFICE PROTRACTOR,

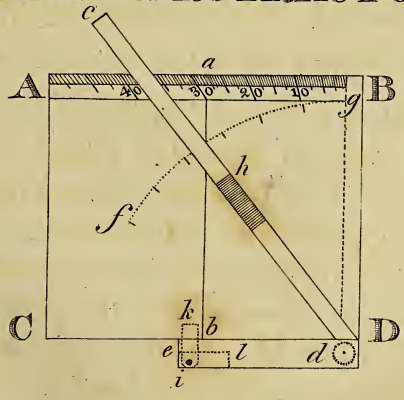
By SIMEON DE WITT, Surveyor-General.

A B C D is a frame of mahogany or other well seasoned wood, A B & C D being an inch and a half broad, A C & B D three inches broad and the whole three quarters of an inch thick. This frame rests on two bars of wood crossing each other in the centre and screwed fast to the underside of the frame at E. F. G. H. On the centre of the cross a perpendicular pin or pivot is fixed about a third of an inch high, a quarter of an inch thick and made

OFFICE-PROTRACTOR



FIELD-PROTRACTOR



perfectly round. This pin or pivot enters a box of brass exactly fitted to it and let into the bottom of the circular board exactly in its centre. The circular board is 22 inches diameter, precisely of the thickness of the frame, made of well seasoned wood, secured in the best manner against warping and graduated as represented in the draught. At the bottom of the letters N. S. E. W. are cavities made with a centrebit about half way through the circular board to serve the fingers in turning it. At H a plate of brass or ivory is laid in the frame with a nonius graduated on it to adjust a course to parts of a degree.

To use the Instrument, fasten a sheet of paper on the circular board by means of a little bees wax applied to its corners ; then turn the degree of the course to be protracted as marked on the edge of the circle to the o on the nonius : Have a square with a projecting shoulder which slide along the lower edge of the frame till it touch the point from which the course is to be drawn and then draw the course along the edge of the square. *For example.* If a course south 30 degrees east is required to be drawn from the point 5 in the traverse represented on the draught ; bring the division marked 30 in the graduated circle between the letters S & E to o on the nonius. The square (represented by the dotted lines) with its shoulder pressed close against the frame is then moved till it touch the point 5 and the line 5, 6, is drawn along it, which, as is mani-

fest from inspection, must be south 30 degrees east. Remember always to draw the courses towards you.

If a traverse be so large as to require to be protracted on more than one sheet, draw north and south and east and west lines as 1 d. b 7. a 1. c d. through the extreme points of the protraction on each of the sheets, before taking them off the board, as guides by which to join them properly to each other.

The instrument may be made more complete by filling up the spaces at I. K. L. M. so as to make them useful receptacles for dividers, pencils &c. To do which fasten the rims oo. oo. oo. oo. to the frame so as not to press on the moveable circular board, and make a thin bottom to the spaces between them and the corners of the frame.

In the right hand part of the frame a recess may be sunk to lay a scale in, when wanted for use, so as that it shall not impede the sliding of the square over the instrument.

I have found this instrument to facilitate and expedite protracting more than any other that has hitherto been brought into use. In lengthy traverses of roads and waters its service has been found to be very great. In such protractions as much can be done in one day with it as can be done in four at

least with any other in common use. The largeness of the circle on which the graduations are made contributes much to its accuracy: Besides, the mind is entirely relieved from that constant attention, which is required in the usual way of protracting, to determine whether a given course is to be laid off to the right or left of the meridian. The operation is more simply mechanical and therefore less tiresome and less liable to mistakes.

DESCRIPTION

OF A FIELD PROTRACTOR,

By the same.

A. B. C. D. is a box constructed like a backgammon box, but not so deep, having the sides exactly at right angles to each other: The size when shut is 8 $\frac{1}{2}$ by 14 inches, or 17 by 14 inches, when open. A a & a B are plates of brass laid into the back of the box along its upper edge. a b is the line on which the two parts of the box when opened are made exactly to join. c d e is a bevel, the limb c d of which moves on the centre d and is fastened or loosened by means of a screw, when folded down it falls into a groove made to receive it in the edge of the part e d. To graduate the instrument, bring the end of the bevel even with the edge B D keeping the part e d pressed close against C D. Then from the centre d on which the limb of the bevel

moves describe the arc f g and bringing the limb at right angles to C. D. along its left edge draw the line d g; with the radius d g lay off f g which divide into 60 degrees and, by straight lines drawn through them from d, transfer the graduations to the brass plates A a B, numbering them as on the draught.

To use the instrument. OPEN it as represented on the draught, and by means of a couple of small bolts contrived for that purpose in the inside, secure it in this situation. Fasten on it a sheet of paper with some bees wax applied to its corners, so as not to cover the graduations; bring the end of the bevel in a line with B D pressing the edge of the part e d against C D, then turn the moveable limb till its inner edge cut the degree of the course to be protracted, and fasten it by means of the screw at d, slide e d along C D or A B till the edge of the limb e d cut the point from which the course is to be laid. Observing to turn the one or the other side of the bevel up, according as the course is to be drawn east or west of the meridian and draw either upwards or downwards along the limb according as the course is to the northward or southward of the point from which it is to be laid off.—If the angle of the course to be protracted exceed 45 degrees take its compliment and apply the bevel to the side A C or B D and proceed as before directed. If more than one sheet is required to contain a survey, observe the directions in that case given for using

the *Office Protractor*. The limb c d of the bevel is made to be taken a part at h by drawing c h out of a brass socket fastened to h d, for the purpose of packing it in the box. On each side of e d scales of equal parts may be made.

In order to keep the bevel in its position against the edge of the protractor a small button i k is made to project on it from the groove and to be turned down in the direction i l to lie below the moveable limb when folded down.

This instrument, although not quite so expeditious in its operation as the *Office Protractor*, is yet so vastly superior to the common protractor, that surveyors who have had it in use have considered it such an essential part of their equipment for the woods, that no consideration could have induced them to be without it.

A Letter from Robert R. Livingston, *Esq. President of the Society, and Minister Plenipotentiary of the United States in France, to* Benjamin De Witt, *M. D. of Albany,*

ON THE USE OF PYRITES AS A MANURE.

Paris, 10*th October*, 1802.

Dear Sir,

I HAVE it not yet in my power to reduce to any order the few observations I have been able to make

on the agriculture of such parts of Europe as I have yet seen; which, however, I shall do, I hope in time to submit to the consideration of our society for useful arts, who are neither out of my mind, nor of my heart, and with whom I hope ere long to interchange observations, and to reduce to practice in my native land, whatever I may be enabled to learn in a foreign one. The subject of this letter appears to me of sufficient importance to call for immediate attention, as it may lead to experiments and deductions that may be found very useful to our common country.

In an excursion that I lately made into Flanders, I observed at some distance from the road, several large beds of earth that appeared to me to emit smoke and flame, which two men were tending. I stopped the post-chaise and went to examine it; I found that it was pyrites, sufficiently impregnated with sulphur to burn when dry: This was layed into beds, and fire set to it; they endeavored to extinguish the fire when the ashes was red, if it burnt longer it became black, and the quality of it was not so good. This earth so burnt was easily reduced to powder by a wood mallet, and in this state was carried upon the backs of asses forty and fifty miles as a manure, and was used particularly for grass, at the rate of about six bushels the acre. The seed grain was also covered with it as with gypsum in our country; this circumstance induces a belief that the sulphuric acid is both in this and in the gypsum

the fertilizing principle, and may suggest many other ways of applying that cheap material to the purposes of agriculture. It is presumable that in this very slow combustion the sulphuric acid is absorbed by the ashes, or rather earth, while the inflamable matter is dissipated; and that the union of the alkali and the acid forms a salt not unlike in its chymical relation to gypsum, or perhaps one that is more soluble, more impregnated with the acid—perhaps diluted vitriolic acid directly applied, would be found equally useful, or rendered more valuable by being combined with wood ashes, when native gypsum could not be conveniently had. If I rightly recollect, Duhamel mentions that sulphuric acid scattered over weeds with a view to destroy them, made them grow with additional vigor.—At Amsterdam I found a number of vessels waiting for the ashes of the turf, the principal fuel of that place, and which is supposed to contain sulphur.—This is purchased at a high price and is carried into Brabant and Flanders as a manure, and must come extremely high to the cultivator because of the time that vessels are in waiting before they can receive a load, as it is sent them every day as slowly collected from the inhabitants—a very judicious regulation prevailing here which I could wish to see extended to all our large cities. It is found with us that want of proper repositories for ashes frequently occasions dangerous accidents. In Amsterdam the city is divided into many rounds, a cart goes every morning to each house and receives

the ashes, which it carries to the vessels in waiting, and receives the price; a considerable revenue is derived from this object, and this tax is clear gain to the rich, whose servants would receive the ashes as with us, as a perquisite, and burn a proportionably greater quantity of fuel to increase it.

From the place where they were burning the earth I proceeded to the oar bed, which I examined and found the earth very similar to what I have seen on my own estate in Clermont, and which may indeed be found in many of our black meadows. I send you a sample of the earth as a guide to search it at home; many of our fellow labourers, will, I dare say, know where to find it; I also send a sample of the ashes. I would recommend to the society to have some experiments made on this interesting subject: first, by searching for a similar earth, drying and laying it in beds of about a foot thick and burning it, occasionally stiring it with a rake—then pounding and sifting it in a lime sieve: if the earth should be too inflamable perhaps a mixture of lime, which it would convert into gypsum, or wood ashes would be found useful. Second, by trying the effect of diluted vitriolic acid as a manure singly, or mixed with ashes. Third, if it is clear that this acid is a fertilizer, to endeavor to find one that is still cheaper, and that might perhaps be found still better, as it had already composed a constituent part of vegitables. The pyro ligneous acid may be obtained at almost no expense, by con-

verting wood into charcoal in a hill, and condensing the vapor—the charcoal would repay the expense of the operation, particularly where wood was cheap. If the pyrites is in lumps it must be reduced to a coarse gravel before burning.

I WRITE to you in too much haste, lest I loose the conveyance, not to render an apology necessary, but you will have the goodness to excuse my inaccuracy and put my information into such form as you shall deem best to render it acceptable.

I PRAY you to present my respectful homages to the gentlemen of the society at large, and my particular remembrances to my numerous friends among them, and to be assured yourself of the sincere esteem, with which

I have the honor to be, dear sir,
Your most ob't humble serv't.
ROB. R. LIVINGSTON.

Dr. DE WITT, *Sect'ry to the Society for useful arts, &c.*

AN ESSAY

ON SHEEP, WOOL, AND WOOLLEN MANUFACTURES, SHEWING THE ADVANTAGE OF IMPROVING AMERICAN WOOL, BY THE INTRODUCTION OF SPANISH SHEEP, &c.

By ROB. R. LIVINGSTON, L. L. D. President of the Society.

I HAVE seen with pleasure that the agriculture of my native country has improved considerably, in the short space of four years, the time of my absence. Much however remains to be done before it acquires that perfection to which all nations should aspire, but which none that I have seen in Europe, Lombardy and south Holland excepted, have in any degree attained. England, though she boasts with reason some of the best farmers in the world, is but partially improved, many districts are ill cultivated and old habits are not yet rooted out. I shall, as time and leisure admit, take occasion to lay before you such practices of the old world as I think may be advantageously adopted by the new; at present I wish to draw your attention to a subject which our probable rupture with some of the European powers, renders peculiarly interesting at this moment. I mean the improvement in our breed of sheep. It is upon this that we must rely for our independence upon Europe, in an article of the first necessity.

THE sheep of this state, taken collectively, are

superior to almost any native race that I have seen in France, Holland, Lombardy or Italy, and very much resemble the south down sheep of England. In general, the sheep of those countries are about the size of ours; those upon the sea coast on the channel and Lombardy are larger; those in Britany much smaller. The wool of most of these breeds is inferior to ours in fineness, if we except the sheep upon the borders of Spain, some travelling flocks in the kingdom of Naples, and those in the small district of Berry. Anderson says, that wool sent from New-Jersey sold at the rate of the finest wool in England.

I BELIEVE in cold or temperate climates the inferiority of quality in the wool, does not arise from climate, but from other accidental causes which I shall point out. In France I attribute it first to a neglect of those breeds that bear fine wool, and next to the manner in which the sheep are kept.—They are folded in close pens, during the summer, all night, and part of the day. In winter they are crowded in small and ill aired houses; they are fed upon the commons on the road sides, and on the stubbles, always confined close together by the shepherds' dogs, who are continually running round them, to prevent their straggling or touching the grain or meadows at the sides of them, for there are no fences. In dry seasons they are extremely pinched for food, and in the winter no green fodder or clover is prepared for them, and very seldom even

hay; they are left to glean in the fields when there is no snow, and when there is, to feed upon the coarsest hay, or the leaves and branches of trees, which is frequently the only provender laid up for them. It is held by the British agriculturalists, that bad keeping makes bad wool. If the sheep are alternately well fed, and starved, the wool will be of different strength and thickness, and of course unequal and of a bad staple.

That the climate effects no change in them, I infer from the great success that has attended the introduction of Spanish sheep, which, where they have been treated with a little attention, have so greatly improved in their size, form and fleece, without any change in the quality of the wool, that full bred rams imported directly from Spain, may now be purchased in France at a much less price than rams from the national flock at Rambouillet; a race that were introduced about twenty years ago into France. Superfine cloth can only be made from Spanish wool, and that without mixture with other sorts, from which it differs so materially, that Anderson asserts, on the information of British manufacturers, that they cannot be wrought together. The different species of broad cloth are not made by mixture with British wool, but by Spanish wool of different qualities. The coarse cloths only, are made of British wool. France, as well as all the rest of Europe, being dependent upon Spain for the wool used in their fabricks of fine cloth,

made various attempts to introduce Spanish sheep. In 1766, a number were imported and distributed among the people of different districts. But as the general opinion was, that Spanish sheep could only thrive in Spain, that the wool would degenerate if they did not travel from the plains to the mountains, and from the mountains to the plains. And above all as the peasantry thought, that what they received without price could be of little worth, no attention was paid to keeping the race distinct, and of course little advantage resulted from the measure, except to a few enlightened farmers : But their experiments sufficiently proved the practicability of the project, and determined the government to make the attempt again, and to put the direction of the project into the hands of a distinguished agriculturalist.

Application was made to the king of Spain for permission to draw from his dominions a number of merinos, the name by which the fine woolled sheep are distinguished. He not only permitted this, but ordered that they should be chosen out of the finest flocks in the kingdom. In the year 1786, they arrived at Rambouillet, the national farm. Instead of giving away the increase as had before been done, they were annually sold, which of course put them into the hands of the richer and more intelligent farmers. At first they brought a very moderate price, but their superiority over the other sheep of the country, the great improvement in the wool

that resulted from crossing the breed, were so manifest, and the evidence that experience afforded of their supporting the change of climate and treatment without any sensible change in the quality of their wool, rendered the demand for them so great, that they have considerably advanced in price. In 1796, the average price was 80" franks, about 16 $ the last sale (April, 1805,) the average price for a ewe was 250", that is about 50 $; rams brought from 60 to 120 $. This is the more remarkable, as by the last treaty between France and Spain, the former had a right to draw 5000 merinos from the flocks of the latter, 500 to be chosen annually for ten years. Skilful shepherds were sent to select them, and France now possesses above thirty thousand of these sheep by importation and by natural increase, and yet the price of the stock at Rambouillet has been regularly on the rise. The late minister of the interior, Mr. Chaptal, has a very fine flock consisting of 1200 sheep. As the sales at Rambouillet were over before I returned from Italy, I requested him to spare me five from his flock, to which he consented, provided I only took lambs and not more than two rams, for which I was to pay 1500 franks, about 300 $; this too was a very special favor. The shepherd I sent to choose them found the flock infected with the scab. I did not therefore think it prudent to take them, but left the money with a gentleman who has promised to bring them out next spring, either from that flock, or those at Rambouillet. I should mention

another circumstance which proves that the wool does not grow worse in France when the stock from which they sprung was good. In April every year, there is a sale of lambs of the preceding year, and of wool; the price of the latter was kept down by the artifices of the wool dealers, who pretended that it was inferior to Spanish wool. Some of the manufacturers, however, having for the two or three last years produced cloth at the exhibition, made of this wool equal to that from the finest Spanish wool, the price has advanced to a par with the wool brought from Spain.

I SHOULD observe that the fine French cloths are finer and softer than those made in England, probably because very little of the finest Spanish wool goes to England, their import consisting of the second and third sorts with some still coarser. The finest of the wool, to the amount of about three millions of pounds, is manufactured at the royal facturies in Spain, and the remainder goes to France and Italy. The quantity of wool drawn from Spain by France, was before the revolution about 4,000,000lb. but the manufactures having been ruined during the revolution, it was greatly diminished; what it is now I cannot declare. In the year 1786, England imported only three millions, but in the year 1796 the following is the state of the legal export from Spain, some is always smuggled into France and elsewhere.

France - - - - - - -	600,000
England - - - - - -	6,000,000
Holland and N. - - -	3,200,000
Italy - - - - - - - -	1,000,000
	10,800,000

Spain employs about 3 millions of pounds in her own manufactures. It may be proper here to observe, that all the sheep of Spain are by no means merinos, but more of the stationary flocks are either what they call chorinos, which are a large hardy coarse woolled breed, or a mixture between them and the merinos, part of this latter wool is also exported.

As my object in this essay is to endeavor to impress upon my country the importance of propagating this breed of sheep, it may be proper to shew the value of this wool compared to that of other races, and particularly of that of England, and to remove some false ideas that have gone abroad relative to them.

The prices at Madrid for washed wool, in the year 1796 were as follows :

		”		”	c	Cts.
Leonise	from	5	to	5	4	about 100
Segovieme		5		4	60	88
Sorriens		4		4	25	86
Arrogon		3				60

Anderson gives the value of wool in the London market about the same period, which reduced to our money stands thus: for the best

German	22 Cents.
Polish	25
British	17
White Persian	84
Red Carramuman	100
Spanish	93

It appears from this, that the finest Spanish wool is not carried to England, since the price there was below the price at Madrid about the same period. Gov. Pownal in a letter to Arthur Young, 1788, gives the following as the average prices of British wool: Coarse 7 and an half pence, common 8 and an half pence, fine 11 pence the whole fleece; that is, reduced to our money about, coarse 14 cents, common 16, and fine 20; the south-down, which appears to me to have the staple of our best wool, 1s or 1s and 9 pence our money. This difference between the price of British and Spanish wool, is the more worthy our notice because it enables us to combat the prejudices which so generally prevail among us in favor of British sheep. We should then stop and examine candidly, how far those prejudices are well founded. Britain contains a great variety of sheep, from the long woolled sheep, bred in marshy grounds, to the small fine woolled sheep fed on the Welsh mountains. The Durham breed, which is I believe the largest, weighs about

260lb. live weight, and yields from 6 to 8lbs. of wool; but this wool would be of little value except where blankets or camblets are made; its value in England, is about 14 cents the pound. A Spanish fleece, taking the flock round, will yield, exclusive of tags, about three pounds each, (mine give me near four) worth at least 90 cents, that is, for the whole fleece, 227 cents. The British fleece at 7lb. which, stating it high, for a flock round, at 14 is 98 cents, less than one third of the value of the Spanish fleece, and yet the sheep weighs only about one third of the weight of the British sheep; and if, as I belive can hardly be doubted, animals of the same species eat in proportion to their bulk, the expense of the British sheep must be three fold greater than that of the Spanish merino; or in other words we may have three Spanish fleeces, worth together six dolls. and 81 cents, at the same rate as one long woolled British fleece, worth only 98 cts; but this is not the only objection to these sheep; the strongest is, that we have few or no pastures adapted to them, they would then of course degenerate. Indeed this breed is by no means the favorite breed in England. Those now generally sought for rich pastures are the Dishly, which weigh alive about 150 pounds when fat, and the south-down for lighter land. The Dishly is of the long woolled kind, and may give about 6lb. of wool, worth 16 cents the pound, so that the only advantage it has over the former breed lays in the carcass, which is indeed the principal object in England, on account of the

low price of wool and the high price of meat, circumstances which do not operate in this country, where wool is 50 per cent. higher than in England, and mutton 80 per cent. cheaper. I shall subjoin to this, a note of all the breeds of England, together with the quantity and price of their fleeces, so that every farmer may compare their value, supposing even that they would not degenerate, with the value of Spanish sheep, which we know will retain their advantages in our pastures, and under our warm sky. Since however the rage in Britain for fine sheep (by which is meant sheep with fine carcasses without regard to the wool) has so greatly increased, that 500 guineas are some times given for the hire of a ram for the season, no expense is spared in their food, and in proportion to their size must be the richness of their pastures, and winter provender; turnips, tares, cole, potatoes and rie in the spring are essentials, and sometimes even wheat must be sacrificed to them if a backward spring should prevent the grass from coming forward in time for the lambs; for it is a rule always to keep them in an improving state, and this at so much expense, that Mr. Macro, one of the best farmers in England, asserts, that these fine breeds sink the value of the wool, and almost of the flesh in keeping, or in other words are not profitable to the farmer. How much less profitable would they be here, where so little attention is paid either to the summer or winter provision for sheep? And indeed experience has proved English sheep do not suit our climate or

management. Numbers have been imported, but no trace of them remains after the third or fourth generation, unless it be near the sea coast, where the climate is moist, and where they can occasionally have recourse to the salt meadows. Add to this, that the flavor of all this factitious mutton (if I may use the term) is very much inferior to that of those which are capable of maintaining themselves in health and vigor with less care and attention.

It should be observed, that the prices above noted are near fifty per cent. less than wool of the same quality would bring in the United States, and that we discriminate less as to the quality. When however we manufacture more extensively, we shall necessarily distinguish the different qualities of wool, and of course Spanish wool will bear the same relation in price, to fleeces of inferior quality that it does elsewhere. Should we on the other hand grow more wool than we choose to manufacture (of which there are strong indications at present) since it is the only article that has ever risen in price, this many years, Spanish wool would become an important article of exportation to every part of Europe, since we find that even in Spain, it is worth (the finest) about 8s the pound. The markets of England would always be open to it, and such is her demand, that if we could supply her consumption of 6,000,000lb. it would restore to our mutual advantage the balance of commerce between us.

The merinos are rather smaller than the largest sheep we raise on the north of the highlands.—Those bred at Rambouillet are better made than those imported directly from Spain. The belly, cheeks, forehead and hind legs, are covered with wool that is short, curled and thick, and tho' extremely white when washed, yet brown at the extremities when on the sheep, particularly if folded or kept on any but the cleanest pasture; this is owing to the extreme thickness of the wool, which encreases the perspiration of the animal, or rather perhaps to the greater quantity of greese that the wool contains, for in this circumstance it greatly differs from common wool, and it is never found harsh or dry. The wool on the thigh, which on our sheep is harsh and intermixed with hairs, in the Spanish sheep is soft and fine. From the thickness and evenness of the fleece the sheep is guarded against the wet and cold more effectually than our sheep, whose fleeces are looser, and whose bellys after the second or third year, are only slightly covered with hairs instead of wool. Mr. Macro observes that the most thrifty sheep throughout the winter, are those that have the thickest and most even coats. The fleece is entirely free from hair which renders other wool harsh, and which never takes the die perfectly.—Having procured samples of all the wool that could be obtained in France, together with the improvement made in each by crossing the different breeds of sheep with Spanish rams, I shall lay them before the

society, which will enable them to form their own judgment as to the quality. The inferiority in the size of the merino, to some other breeds, which some make as an objection, is in my opinion an important advantage, not only in sheep, but in every other stock not designed for the draft; because they will fatten in pastures in which larger cattle would suffer from the fatigue they must undergo in order to procure the food that is necessary for their support. This reasoning applies more strongly to sheep than to any other stock. They are generally kept upon high and dry pastures, that are frequently parched in summer, when fatigue is most irksome to them. To which we may add, that the fleece is not proportioned, as the food is, to the *bulk* of the animal, but to his *surface*, and a small sheep having more surface in proportion to his bulk, must also have wool in the same proportion. That is, a sheep whose live weight shall be 60 lb. and who of course will require but one quarter of the food of a sheep that weighs 240 lb. will, notwithstanding, have half as much wool (if the fleeces are equally thick) as his gigantic brother. The merino has been found in France to be quite as hardy as the common sheep. At Rambouillet they have no winter feed but hay, and yet thrive very well; but what is more extraordinary, is, that in Sweden, where the native sheep are extremely coarse-woolled, the merino has been naturalized without having in any sort changed the nature or quality of the wool, in the term of about 30 years

since they were introduced. They have also been so well cultivated there, that tho' the consumption of fine wool has encreased in Sweden, yet the importation of Spanish wool has greatly diminished.

My own experience has convinced me, as far as trials upon a small scale can do so, that the merino is at least as hardy as our sheep. In the year 1802, I purchased from the national flock, at the veteneRary school, at Chalons, two young rams and two ewes. They cost me, delivered at Paris, (five miles distant) 1200''. Charges, in getting them to a sea-port, maintenance till the ship was ready, and on board, (though the patriotism of the captain would not permit him to take any freight,) brought them to almost double that price by the time they arrived at my farm. One of the rams I spared to my brother. The other, with two ewes, were treated exactly as my other sheep; they were fed on hay, and had no shelter. They brought me two lambs, and sheared eleven pounds of washed wool, near $3\frac{3}{4}$ each. The next year the lambs came in January, were neglected, and died. The wool was not weighed. Last year one of the ewes was sick, and brought no lamb, the other droped a ewe lamb; the five fleeces (from the 3 old sheep, and two sherelings) when washed, weighed 18 lb. besides the tags and waste wool.—The two bred here are in every respect as fine sheep as the imported rams, without the smallest difference between the wool of one, or the other. Upwards of $3\frac{1}{2}$ lb.

wool will be thought a considerable yield from small sheep kept upon hay, in a flock with 20 other sheep. It equals the flock at Rambouillet, and exceeds by a pound the average of the Spanish travelling flocks. My present flock consis's of two full bred rams, and three full bred ewes, including the lamb of this year; eight three quarter bred ewes, whose f rm and wool is already so like that of the imported sheep, that it is difficult to distinguish them. If any difference exists it is merely in the wool, on the extremity of the thigh, which is longer, and I think not so fine as that on the full bloods. I have also 18 half blood ewes and weathers, and about 20 country ewes that have run with the Spanish rams; all these sheep are kept together, they have a shed that they can go into which is open on every side, but the north and northwest; they have hitherto been fed with hay only, tho' I shall, just before they lamb, begin to give them bran and oats, having no green fodder. If any difference is discernable in the flock, it is in favor of the merinos. One circumstance is remarkable, it is that the half bred lambs have not only thicker, but longer fleeces than the common lambs, tho' these have naturally much longer wool than the Spanish merino. This is an important circumstance as it shews how necessary it is to cross the breed of sheep, with those of a better stock. Should it be objected that the object here, is to procure a great quantity of wool without regard to the quality; I would observe, that this might be true, if our land-

holders were an indigent peasantry, who sought only to be sheltered from the cold, instead of being what they are, and I trust always will be, men in such easy circumstances as to look beyond the mere necessaries, to the conveniences and comforts of life. Such men will take a pride and pleasure in being dressed in clothes whose softness and pliancy give warmth to the body, pleasure to the touch, and grace to the wearer. And they will be doubly proud of this, if it is the product of their own farms, and of the industry of their wives and daughters. That this is the fact, we may infer from the quantity of foreign clothes, that are worn by farmers, whose own flocks might supply them abundantly with cloth of inferior quality, if they looked only to warmth in their dress: and from the attention that those among them, whom economy or patriotism induce to wear their own wool, pay to rendering the cloth as fine as the materials will admit. If however it should be thought, that cloth finer than the 3d quality of British cloth, which is generally worn by people in easy circumstances in our country, would be unnecessary, this may be procured by crossing our breed with the merino, so as to have half or even quarter bred Spanish sheep. This would add to the quantity as well as to the fineness of the fleece, and by sorting it in the manner described in the annexed drawing, we would have wool sufficiently fine for the master of the family and for his children, with a coarser sort for the domestics. In fact, the introduction of this

breed of sheep will enable every man to have that quality of cloth, that he likes best, without any additional expense, except that which arises from the spinning finer, which, being a domestic operation in most farm houses, will not be much regarded. In order to give some idea of the fineness and ductility of this wool, I cannot help mentioning, that Sir Joseph Banks, in a letter to Arthur Young, informs him, that the fleece of his Spanish sheep was spun into yarn 156,800 yards (about 90 miles) to the pound. Cotton, in machines, could only be spun into thread of 92,400 yards, and in jennies 144,000; which is much finer than can be spun by hand in England, though it is somewhat exceeded in France.

Though the climate of England, from its too great moisture, is not calculated for these sheep, yet it appears from this circumstance, that they do not soon degenerate even there; and I should suppose, from what I am going to mention, that they are turning their attention to the improvement of their sheep, by a mixture with the merinos. About 20 rams, from the King of England's flock, (for he is himself a considerable farmer) were sold last year at auction; they fetched from thirty to forty guineas a piece. It would then be unpardonable in us, in our country, where they thrive so well, to neglect the propagation of them. I have hitherto viewed this question, with an eye to the domestic manufactures that we now carry

on. But what prevents our manufacturing not only what is necessary for our families, but for the general consumption of our country? Why should not our city beaux, who look beyond convenience to elegance, find the gratification of their taste in the product of our own, rather than of foreign looms? The price of labor is the general objection. This is already diminished by carding-mills, which do the work better, and leave more women to employ in spinning, and of course must reduce the price of their wages. Mills have also been lately erected for spinning wool; and certainly if any wool can be spun fine in mills, it will be that which, from its softness and the evenness of its texture, most resembles cotton. Is it possible, that the price of labor can operate in an equal degree with the various charges that enhance the value of a piece of superfine British broadcloth before it comes to the hand of the American consumer.

1st. The wool must be purchased in Spain where a commission of not less than five per cent. must be paid. The mean duty upon the exportation of wool from Spain is 6d sterling a lb. but upon fine wool much higher, because the duty is proportioned to the quality; this then is not less than 15 per cent. Transportation to the sea ports, freight and insurance, port charges, at landing, must amount to at least 5 per cent. more, before it is stored in London. The merchant's profit cannot be less than ten per cent. thus, before the manufacturer receives the

wool it has paid 35 per cent. upon the first cost.—When manufactured, the clothier purchases it, sells it to the merchant—it must be packed to send off, and transported to London, or Liverpool, or Bristol; it pays a duty of 2 per cent. on exportation to America, tho' not elsewhere; freight, insurance, must be charged and commission paid by our merchant to his London correspondent of 5 per cent. When it enters our port it pays 10 per cent. to the government.—12 per cent. is the smallest profit our merchants charge; all these articles taken together, will add one hundred per cent. to the price of a pound of fine wool, manufactured into cloth, before it comes into the hands of one of our shopkeepers; and yet, this is but a small proportion of the charge, for the commissions, duty, freight, &c. are not merely paid upon the original price of the wool, but upon every previous duty and charge, and upon every expense that attends the manufacturing of it. Thus a pound of fine wool, worked into superfine cloth, is worth, as it comes out of the loom, $6. The commission thus is upon the $6, and not upon one the original price of the wool: If then we pay 100 per cent. on the price of the wool, before it reaches us, we pay in mere charges, independent of the price of labor, upwards of 600 per cent. beyond the price of labor upon the value of the raw material: But the price of labor here does not double that of England; of course then, it is not the price of labor, but the want of fine wool that has hitherto prevented our manufacturing.

And this every farmer knows, for all manufacture their wool rather than sell it, though they might buy coarse cloths relatively cheaper from the British merchant, than fine ones, because the native wool of England, which serves to make such cloths, comes 35 per cent. cheaper to the manufacturer than the Spanish wool, and wool of the description which answers for such cloths is 50 per cent. cheaper in England than in America. Yet, even such cloth, we find a profit in manufacturing for ourselves. How much greater then would the profit be, upon the working of fine wool, where the labor would be but little advanced, and the value more than double. Let any man make this simple experiment; let him sort his wool with attention, and pick out that only which will make the finest cloth to be made from our wool; let it be carded, spun and wove by the same persons, and at the same rate that his coarse wool is fabricated. He will find, that one will give him cloth worth about 10*s.* our money, or 20*s.* if it was the breadth of English cloth, while the other will give him cloth only of 6*s*6, at the same expense, and demand more wool. If then, cloth at 6*s*6 per yard pays him 2*s*6 for his wool, cloth of 10*s.* must pay him 7*s*6; but if, instead of the wool of our sheep, he has Spanish sheep, not the sorted only, but the whole fleece will be so much finer than even his sorted wool from a common flock, that with exactly the same labor that he has expended upon his cloth of 6*s*6 the yard (yard wide cloth,) he will have cloth worth

at least 15*s*. that is, he will sell the whole of his wool (supposing, which is the case, a pound of wool would make a yard of cloth, and the expense of spinning, weaving, &c. to be 5*s*) at 11 shillings per pound. I suppose in this case the wool to be all spun equally coarse, yet the difference in the softness, and suppleness, and in the wear, for the softest cloths not only wear longest, but are much warmer than those which are harsh—would make the difference I have stated in the price. I again, then repeat, that it is not the high wages, but the want of good wool that has stoped the progress of our manufactory of cloth. It is true, that we have not as yet the quantity of wool that is necessary to supply our wants, but how long should we find this deficiency, if without any diminution in the quantity, or without any additional expense, the price of our wool was doubled? I confess that since the introduction of Spanish sheep, I have become so sanguine as to look forward to a period, and that too at no great distance, when this, and the eastern states will not only manufacture cloths in sufficient quantity for their own consumption, but for that of their neighbors. It is certain that no country in Europe is better calculated for fine wooled sheep than this, and the neighboring states. The price of land is comparatively low, our grounds are high, and well watered, and our pastures good, our common grass is of the best and richest kind, the poa pratensis, and poa trivialis (which we call spear grass, and blue grass) are the most common, and most nutricious

of all grasses. White and red clover abound, since the introduction of gypsum, in fields that were burned formerly during the summer; these may be made into hay for winter provender, at half the price that it would cost in the moist climate of Britain. Add to this, that our fields are enclosed, which saves the expense incurred by the constant attendance of shepherds. Our sheep have few maladies, many that are common in Europe are unknown here. There the rot sweeps off whole flocks. I never saw or heard of the rot in this state. Indeed I know of but one disorder, that is common among our sheep, the scab; this seldom is seen where the sheep are well kept, and is easily checked by removing the infected sheep as soon as it is visible. I have found it useful when the snow lays long on the ground, to carry pine or cedar boughs into the fold which they eat readily; when these cannot be conveniently procured, tar spread thinly over a board and strewed with salt is a good substitute.

The Spanish shepherds when they perceive by the wool's rising, the commencement of the scab, they pull out the lock, and taking salt in their mouths, drop the spittle on the bare spot, which they say will stop its progress. The best method, however, when it is only partial, is to wash the part with soap, and to anoint it with an ointment of grease and turpentine. Mercureal ointment rubbed on the sore or on the hams of the sheep is a certain

remedy. The sheep should in this case be kept dry for some days ; this has also the advantage of freeing them from lice or ticks. When the sheep are sheared a good washing with soap suds, and a weak decoction of tobacco, will free them from the seeds of the scab. It is thought essential not only to the health of the sheep in Spain, but to the beauty of the wool, that they should have a full supply of salt. While I am speaking of the maladies of sheep, let me mention one that occasions more destruction among them, than all the others put together—The bite of dogs. This animal is an absolute nuisance in the old settled counties, however useful he may be in the new ones. Nothing can be more vexatious, than after a man has labored for years to have an improved flock, to see them destroyed in one night : yet this has happened to me more than once, sometimes from my own dogs, and sometimes from those of others. The remedy for this evil lays with the legislature ; a heavy tax upon all dogs that were seen without a collar, containing the master's name on a brass plate, and permission to kill them ; together with a light tax upon all dogs furnished with collars, would raise a considerable revenue, and diminish their number. The master should in every case be answerable for the damage done by his dogs. Without this few people will be at the expense of $100 for a ram, besides the risk and trouble of importing him. You gentlemen, will judge how far a matter so material

to our agriculture and manufactures, will merit the attention of the legislature.

In England where more attention is paid to the beauty of the form and the early fattening, than to the wool, and where in these points they have attained an astonishing degree of perfection, it is thought essential to provide such food as will furnish plenty of milk to the lambs, and so to manage, that they never fall off, but are kept in a growing state till they are fit for the knife.

Their winter food is turnips fed on the ground, potatoes, cabbage, &c.—winter vetches, tares, rie sown early, are the spring provision. I see no reason why all these may not be obtained here on easier terms than in England. The land and taxes are lower, tho' labor is somewhat higher. Turnips may, I think, be raised without any other expense than the seed. When the last ploughing is given to the indian corn, harrow it smooth and sow turnips. The largest may be drawn, and the remainder fed on the ground, when it is bare in the winter or spring. Pumpkins would I believe keep the flock in fine heart till January, and if preserved from the frost, to a much later period. I have seen them sold in Paris through the whole winter. Vetches sown on light land, and dressed with gypsum, would yield a certain crop, and give the ewes a flush of milk, and thus save the pastures, that are injured by early feeding, and preserve the grass for

the dry season. Wheat or rie sown early, and turnip seed with it, has been tried to advantage. The turnips are fed off when the ground is dry or frozen, and the grain, tho' fed down, has been benefited by the trampling and dung of the sheep, more than to compensate this inconvenience.

I SHOULD, before I conclude, say something upon the migration of the Spanish flocks, to which the fineness of their wool has been attributed. The travelling merinos of Spain amount to above five millions, they are driven (to the great injury of agriculture) from very remote parts of the kingdom, to the mountains, where they pass the summer, and are wintered in the plains. This keeps the wool from degenerating, by saving the sheep from the fold, and affording them that shade, water, and nourishment, that they could not meet with in the dry pastures of Spain during the hot season. But experience has demonstrated, that this is not essential where they are well kept on the plains. There are many stationary flocks of merinos in Spain, whose wool is not inferior to that of those that travel. On the other hand there are large flocks of sheep in the north east of France, that do travel to the mountains during the summer, and yet bear very coarse fleeces. The merinos introduced into France and Sweden, never travel, and yet their wool has not degenerated.

I FEAR, gentlemen, that I have trespassed too long upon your patience, but I confess to you that I consider the improvement of our flocks by the intermixture of this breed, as an important object in agriculture, and as one that must form the basis of our woollen manufacture. Happily we have the means of extending this improvement—Col. Humphries has imported from Spain or Portugal a large flock of merinos, and I am told, lets out the rams to such as may require them. My small flock from France, together with those I expect out in the spring, will extend the breed to the northern parts of the state. Some other gentlemen have rams, and the prohibition upon the export from France having been taken off last autumn, more will probably be imported. Even the half blooded rams will contribute greatly to improve our flocks, and of these I presume many may now be procured. The samples of wool which I procured while I was at Paris for your inspection, will shew the progressive improvement by crossing with all the different breeds of sheep that could be got in France ; and the annexed drawing will shew the different qualities of wool in the same fleece, and the manner of sorting it. The 4th quality however being much finer than our first.

I HAVE also annexed a drawing of one of my rams, that you may judge of his form, which by no means appears to me defective : tho' some that I have seen directly from Spain are so. The moth-

er of this ram is perfectly formed, according to Bakewell's rule, the limbs are remarkably small and neat, and in France they alledge that no sheep fatten better.

Having been among the first to introduce the use of gypsum and clover in this state, and by precept and example to enforce a system which I have now the satisfaction to find general, in spite of the prejudices by which it was at first opposed, I flatter myself with the hope of being also instrumental in effecting another important improvement in agriculture, and of laying the foundation for a useful manufacture, in fewer years than it has taken to introduce the gypsum; which indeed, by the improvement it has made in our grass grounds, has laid a foundation for the amelioration of our sheep. It is to the substantial farmers that we must look for the first steps toward this improvement. They will not be deterred by the advances which the first cost in the selection of the best ewes and rams may occasion. They will not suffer them to degenerate through want of proper pastures in summer, and good clover hay with potatoes and turnips in the winter. And by wearing the wool of their own flocks, they will convince our fellow-citizens of the practicability of supplying their wants with cloths, equal, at least, to those of foreign manufacture, and at a much inferior price. It may indeed, till we have made some further advances in dying and dressing, want that gloss which it receives in

foreign fabrics; a gloss, which wears off in a few days, and is known without adding to its softness, warmth or beauty, to injure its strength.

Letter, on the subject of Sheep, continued, and on the best method of driving Oxen.

CLERMONT, 18*th March*, 1806.

DEAR SIR,

I WROTE to you last week, and sent you samples of wool, marking the progressive improvement on it in various breeds of sheep, by crossing with Spanish rams. I should be glad to learn that you had received my letter. I am happy to find more than a confirmation of my assertion, that by adopting my plan, the state would be enabled, in less than five years, to better their wool by at least 4*s.* a fleece, as you will judge from the following facts, stated in Bath society papers:

THE South-down sheep greatly resemble ours; their fleeces sell at about 1*s.* sterling the lb. It appears, by a certificate from the woollen manufacturer, Mr. Joice, that the cross between them and a Spanish ram improved the fleece to the value of 2*s*3 lb. This makes the difference of 5*s.* sterling in a fleece of 4 lb. It is also worth while to know, that this wool, so improved, will make cloth which sells in America for 40*s.* The Bath society sent 60 lb.

of unwashed wool to be manufactured; this, when scoured and washed, produced 39 lb. of this 23lb. being of the first quality, made cloth of 15/6 sterling value. If you calculate the British and American duties of 12½ per cent. and the package, commission, freight, insurance and mercantile profit, you will find that this cloth can not be sold at less than 40/. our money, if so cheap. 14 lb. being the 2d assortment, made 7 yards of broad cloth worth 12/. sterling; this would sell here for 35/. The 3d, 2 lb. only, was made into list. It is evident then, that the finest cloth worn here may be made from half-blooded Spanish sheep. I venture to hope therefore, that, after the end of next year, the members of our society, the officers at least, will appear in homespun.

You can hardly think what a nuisance dogs are. Two of my neighbors have had their sheep killed last week by them, and I have had two of mine bitten, and only saved by an accident. This, and the melancholy deaths that are so frequently occasioned by canine madness, and the absolute inutility of dogs in a settled country, should certainly lead the legislature to some measures for diminishing their numbers.

Before I dismiss the business of sheep, I would submit one reflection to my brother farmers, which they will find important. That is, that they either breed for long combing wool, or for carding wool.

The mixture of cloth, lessens the value considerably. If their pastures are rich, and moist, perhaps long wool will be best adapted to it. In this case, they should cross their flocks with British, Dutch, or Flanders rams, provided their ewes are long woolled, as too many of ours now are, by the predilection which has generally determined our farmers to prefer English sheep; if they are not, let him change them for the longest woolled ewes that he can find. If he wishes carding wool, let him find ewes with the *shortest*, thickest and finest fleeces, and cross them with Spanish rams.

In choosing a ram, see that his wool is thick, and close on the back, or he will not winter well, and that it feels greasy which is a sign of health. Let him examine well, both rams and ewes when they are shorn. If white hairs are found in the wool of any; fat those sheep off, and do not breed from them—So if they are coarse woolled on the thighs. By this time I presume you think I have said enough on the subject of sheep. I will therefore change it for another, which tho' not equally important, may serve to furnish useful hints.

It has long been wished that some means might be contrived for driving oxen with lines, as we do horses; but their mouths do not appear fitted for the bit, and bridles would certainly be an obstruction to their chewing the cud. A ring fixed in their noses, is apt to be torn out by bushes, &c.

and is always an obstruction to their feeding. I have seen in some parts of Italy, I think in the neighborhood of Rome, a mode of using lines which is free from these objections. It consists in two flat pieces of iron, that turned at the lower ends, and formed a forceps, these bars shut over each other, and when closed the ends gently pressed upon the cartilage of the nose of the ox. They were kept close by being tightly bound at the top, and strapped against the forhead of the oxen. It was seldom, if ever, however, that I saw lines attached to this, but it seemed to be used to govern the ox occasionally. But lines and rings might certainly be advantageously attached to this forceps, and if I remember I have sometimes seen it done—having seen oxen attached to lines, but at a distance when passing in a carriage, I had not the means of examining how they were fixed.

It is a great question in what way an ox draws with most advantage to himself? In England they prefer a harness, but not meeting with it in any other part of Europe, I think it must be liable to some strong objection; one indeed arises from the expense, which alone will keep it from being general. Yokes are used in some parts of Italy, but they differ from those that we have adopted in this particular. Instead of bows, there are four flat pieces of wood, which hang from each side of the yoke and are about 10 inches long, and hollowed so as to fit the side of the neck, they are so thick as to

admit a rope or chain to pass thro' them, by which they are fixed to the yoke, and each pair of them are united by a chain or rope under the oxen's necks. You will see that the draft is in this case, by the top of the shoulders only, and I believe is to be preferred to our bows on that account, because the bow by pressing the shoulder blade impedes the motion of the animal. You will ask how they hold back, as with us the ox coming down hill, holds back only by turning his neck against the bow? This is effected thro' all the hilly country of Italy, whether they use yokes or draw by the horns, by a contrivance that might certainly be usefully adopted here. The end of the pole projects considerably beyond the heads of the cattle, and turns up very much; to this is fixed a leather strap that goes round the horns of the oxen, so that they keep back the weight by their horns; the cart can not go forward without dragging the cattle. In this way, they keep back with much more ease than ours do by twisting their necks. In the flat country as it is very seldom that they have to go down hill, they seem to trust to providence when they do, having made no provision for a case that seldom happens, at least that I saw, but they may have some resource which I know not of: as I found in Holland, one which I should not have thought of (in driving their waggons as they do there without breech harness) had I not seen a man going down one of the dykes, his farm laying below it, with two sprightly horses. He kept his foot against the

buttock of the horse, and by that means kept back the waggon. It was not indeed loaded, perhaps if it had been, he would have had some better expedient. If we may argue the utility of a practice from its extent, we must prefer drawing by the horns to any other mode ; nine tenths of Europe make their cattle draw in this way, and from what I have seen of their performance, I am persuaded that it is to be preferred to the yoke. A bull's strength appears to be placed in his neck, and in drawing in this way the whole of it is exerted ; his motion is not impeded, or his skin chafed as it is by the yoke. You will find a description of the yoke and strap used for this purpose, in the papers I left with the secretary, submitted by Mr. Noble, it will not be necessary to repeat it here. In the mountains of Savoy I saw many cattle chiefly cows, drawing by the horns, not in carts, but in waggons. How far the working of cows is advantageous deserves consideration. It appears to me that it would be proper to have the cows of a farm broke to the yoke, that they might be used in harvest or seed time, when an ox was lame, or upon any other occasion when the farmer was pressed. It is observable however that our cows are in general much smaller than those usually worked in Europe.

I would take the liberty to suggest to the Society, the propriety of having an appendix to each of our volumes in which we should insert matter that

was not strictly original, but which would be very important to diffuse the knowledge of in a country where foreign books upon agriculture are difficult to obtain. Our newspapers also frequently contain many useful discoveries, the memory of which get lost for want of a repository for them.

I am, dear sir, &c.

ROB. R. LIVINGSTON.

EZRA L'HOMMEDIEU, *Esq.*
Vice Pres. of the Society.

Letter, containing experiments on the subject of Sheep, by the President of the Society.

CLERMONT, *4th June*, 1806.

DEAR SIR,

HAVING endeavored to convince the Society of the advantages that would result from the introduction of Spanish sheep, I think it will be useful to lay before them the experiments that I have just concluded. My flock consists of 45 sheep—5 full bred Spanish sheep, to wit: two rams, two old ewes that have lambs, and one ewe lamb of last year; 8 three-quarter bred ewes, whose wool is nearly as fine as that of the full bred, except that which they carry on their thighs, which as on our sheep, is not entirely free from hairs; 13 half-bred lambs of last year, four of which have lambs, and 19 common sheep of a very good stock, all, except two of these, are ewes.

The five full bred sheep gave me 22½ lb. of wool, that is, each 4½ lb. and three lambs, one of which died.

The 8 ewes of three-quarter blood, gave 29 lb. of wool, and 8 lambs, that is 3⅝ lb. each.

The 13 half blood lambs, 50 lb. or something more than 3¾ lb. of wool each, and four lambs.

The 19 common sheep, 60 lb. of wool, or a trifle more than 3 lb. each, and 16 lambs.

The sheep were well washed before they were shorn, and the tags, &c. not counted.

Now, Sir, taking the mere quantity of wool, the advantage was greatly on the side of the Spanish sheep and the mixtures with that race; but calculating their value by the English prices of wool, it will be infinitely greater.

The price of Spanish wool is 6*s.* sterling in London; the average value then, of each sheep, 4¼ lb. is 25*s*6 sterling, without the lambs. The average of the three-quarter bred, 3⅝ lb. supposing their wool to be half the price of Spanish wool, and it is certainly worth much more, would be about 11*s.* sterling, besides a lamb to each ewe. The half-blood gave 3¾ lb. and a fraction; their wool is worth, agreeably to an account I have sent you from the British manufacture (supposing our common sheep to be equal, as I think they are, to the South-down) 2*s*6. sterling. That is, for each

sheep 8*s* 1½. The common sheep gave 3 lb. each, worth in England 3*s*. sterling, or one shilling a pound. The keep and food of my sheep was the same; these different races run together, winter and summer.

One hundred Spanish sheep would then pay for the keep, exclusive of lambs,	£127	10	0
sterling, if half ewes.			
One hundred three-quarters, if all ewes,	55	00	0
One hundred half bred sheep,	40	12	6
One hundred good common sheep,	15	00	0

So that every farmer, who keeps common sheep, when he might have half bred Spanish, looses £25 12 6 sterling a year upon one hundred sheep, besides the great difference between the value of the lambs, till the country is fully supplied, which it will not be in many years. It is true the calculation on the full bred Spanish sheep may be taken too high, from my counting two rams with the five sheep, which gave the one 6½ lb. the other 5⅕ lb. of wool, but then the ewes were two of them very old, and had three lambs. If therefore the flock were to consist of one half wethers the calculation would be about right.

I HAVE made another comparative experiment, to ascertain the value of the wool, if manufactured here. Common wool afforded me cloth worth about 10*s*. a yard, and a pound of wool makes nearly a yard of cloth, the expence of manufacturing is 6*s*7, this leaves 3*s*5 for the wool and trouble of getting it

manufactured. Spanish wool unsorted, the whole fleece taken together, spun and wove as the other, gave cloth worth at least 18*s*. deduct 6*s*7 for the expense, leaves 11*s*5 per pound for the wool and trouble; but if this was sorted and spun finer, a much greater profit would result from the manufacturing of this wool. I shall order this experiment to be made the ensuing season.

I am, &c.

ROB. R. LIVINGSTON.

BENJAMIN DEWITT, *Esq.*
Secretary of the Society.

N. B. I HAVE weighed my cloth, 15 ½ yards weigh 9 lb. 9 ounces of the finest. I sent 15 lb. to be manufactured, so that the waste must have been uncommonly great, if all the cloth was returned; 7 ½ yards of the common, spun equally fine, weight 5 lb. 9 ounces.

As the Annals of Agriculture are too expensive to be in many hands in America, I have extracted some articles relative to sheep, which the Society may think curious, and which may be considered as an appendix to what I have submitted to them on that subject.

"THE *price for rams by the season.* From the first letting, in 1780, the prices kept gradually rising from 15*s.* to a guinea, and from one guinea to ten. In 1780 Mr. Bakewell let several at ten guineas each, and Mr. Parkinson for 25, a price which then astonished the whole country. From that time, 1786, Bakewell's stock rose rapidly from ten to one hundred guineas; and that year he let two-thirds of a ram, (reserving one-third to himself) to two principal breeders, for 100 guineas each. The entire services of the ram rated at 300 guineas. Since that time the prices have been rapidly rising; 400 guineas have been repeatedly given. Mr. Bakewell making this year, (1789) 1200 guineas by *three* rams, (brothers,) 2000 of 7. His whole letting this year being full 3000 guineas."

N. B. The Bakewell sheep is long woolled, the fleece worth only about 4*s.* sterling the wool 9*d.* a lb. The value consists in the carcass, and the readiness with which they fatten.

I find that they are at present turning their attention much to Spanish sheep in England, as you will find by the following extract:

"Mr. Mardamet, speaking of several fine animals of Mr. Eccleston, mentions a Spanish ram,

and says, "This curious creature is of a round broad shape, made like what the common people call a punch horse. The wool, compared with a flock of double lambed Carnavon sheep, appears like silk. He is valued at £500 sterling. I am told that the ram was a present from his majesty of Spain to his majesty of Britain, and a noble present from our king to Mr. Eccleston." 19 vol. 253.

"In all our manufactures (speaking of French manufactures) we make use of the 1st, 2d and 3d quality of fine Spanish wool. Of all the wool produced in Europe this is most certainly (as is acknowledged by the manufacturers of all nations) the softest, the finest, and at the same time the strongest, on account of its elasticity, and the only fit to be used in the fabrication of fine and superfine cloth." 16 vol. 228.

"English wool, though of great worth, is neither in France or England used in the fabrication of superfine cloths, it is employed in that of camblets, serges, &c. to which it is better adapted, on account of its being rotten and dry, but long, fine and shining." ib. 229.

"The attention which has been given to wool on the Downs, among a few breeders has begot an argument, or rather assertion that the closer, finer, and firmer the coat of wool, the better will the sheep thrive and fatten. They support it by another as-

sertion which merits attention, that the Spanish blood, half Spanish, and Ryland, is the most thriving there is on all the south Downs, but observe at the same time their tenderness, or not equally bearing the fold." From Sir John Senclair, An. Ag. 17 vol. 302.

"I WENT two days ago to see the flock of the society, [N. B. society for improving British wool] they are kept four miles from Edinburgh, and are thriving to our wish, we shall be able to produce as fine wool of the growth of Scotland (particularly from Mr. Dauberton's ewes) [N. B. Spanish sheep from France] as perhaps ever came from Spain. One experiment has answered beyond all expectation; a lamb of above a year old, a cross between Lord Cheviot's Spaniards and a Cheviot ewe, was clipped, and *clothed* on the third of October last, its fleece has grown about an inch since, and for softness, fineness and colour, exceeds almost any thing you ever saw, and the animal is in the best order of any in the whole flock."

MR. YOUNG, speaking of a merino ram, given him by the King with which he appears highly delighted, after describing his extreme fine wool, &c. adds, "In regard to the thriving quality of this breed, it is a point of such importance, that I was anxious to ascertain it. Of the wool, none could have any doubt, but from certain points which predominate in Spanish sheep, this was cer-

tainly a question. I had it not it in my power to make a trial absolutely complete, but I formed a a comparison, the result of which follows: I tied him up in stalls during part of the winter, and the rest of it he was in the field; fed exactly during the whole as other rams that were compared with him. In stalls he beat the Norfolk breed.

No. 1. Don, weighed 84 lb.

No. 2. A ram, half South-down, one-quarter Norfolk, one-quarter Bakewell, 141 lb.

No. 3. A South-down, from Mr. Ellman, 136 lb.

These were fed abroad together till March 20th, when they weighed:

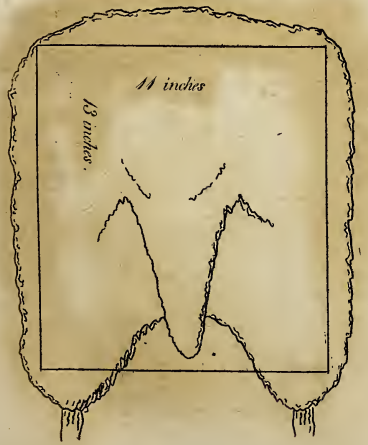
No. 1, . .	100 lb. . . .	16 gain.
No. 2, . .	148	7
No. 3, . .	144	8

N. B. It appears from subsequent experiments, that three merinos eat less than two South-downs. The same food then gives

In Merino flesh, ...	48 lb.
In South-down, ...	16
In mixed breed with Bakewell, . . .	14

"This was a superiority, of which I confess I did not dream."

In a subsequent set of experiments on lambs, the superiority is still greater in favor of the mixture of one-quarter Spanish blood, over the South-down, Norfolk and one-quarter Bakewell, though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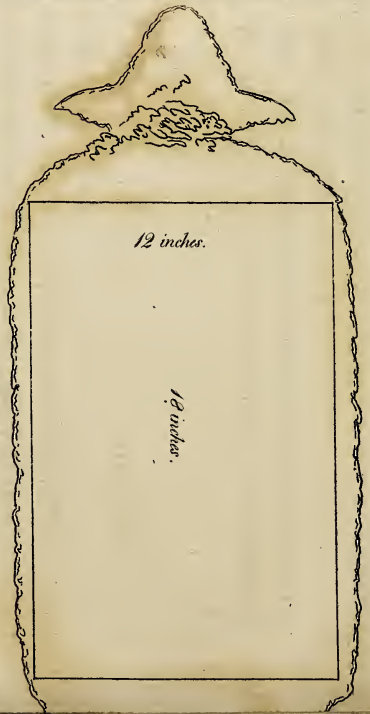
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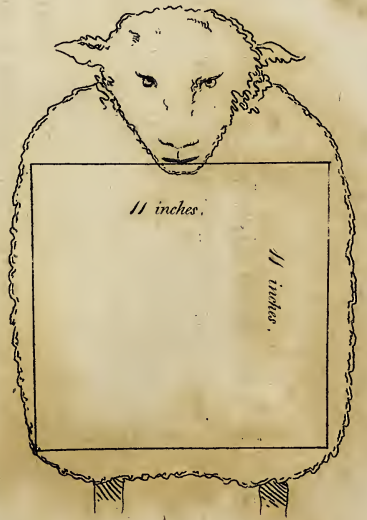
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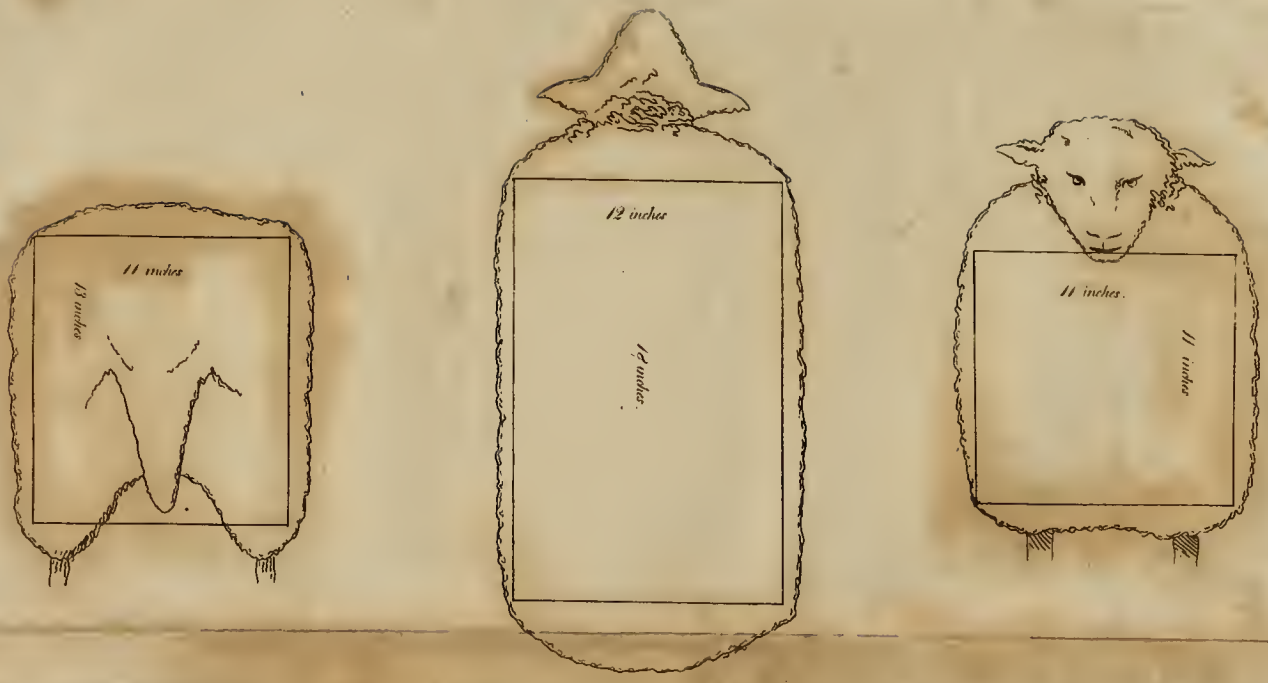

A Tup belonging to Mr Bakewell.

these are the finest sheep in England; the South-down and the Bakewell particularly for fatting quickly. How valuable then must the Spanish breed be, if they equal them in this point, and exceed them as three is to one in the value of their wool; while being one-third smaller, they require only a third less food.

I annex a drawing of a Bakewell ram, from the Annals of Agriculture.

ŒCONOMICAL ENQUIRIES CONCERNING SHEEP.

What are the sorts of sheep in England?

DORSET.—Very woolly, short legged, rough head, horns round, bred on fine hilly downs, 4 lb. wool, good, chiefly for house and grass lambs, require a fine short bite and are tenderest of all.

2. Wiltshire.—High long legs, short wool, bare bellies, white faces, horns falling back behind their ears close to the head, wool 4 lb. chiefly for stock, hardy, require a short bite.

3. Linconshire, Leicester, and Northampton.—Shortest legs of all, vast fleeces from 8 to 12 lb. wool long, but inferior, no horns, white faces, and great carcasses, in strong rich pastures that give a mouth full, marches.

4. Treswater.—do. but much longer legged, do. food.

5. South-down.—Small black faces and legs,

no horns, wool very short and fine, from 2 to 3 lb. sells by 1d a pound higher than the rest, very hardy and fit for hills.

6. Norfolk. Middle size, horns, long legs, black faces and legs, wool 3 to 4 lb.

7. Nants. Do. but longer legs, and not so clear in the bellies, do. food.

8. Mountain, viz. Wales and north. Very small, indifferent wool $\frac{1}{2}$ to 1 lb. long legs, horns.

What is the proper food for sheep at different seasons?

In summer common grass, clover; in winter turnips; from turnips, some to tares (Vetches) in the spring before the grass is ready, this the universal practice.

The most common diseases are,

1. Rot—Proceeding from springy ground.—Symptoms—The red membranes of the eyeleds look white, gums the same, the parts on each side of the udder loose the waxy quality which always adheres to these parts when in health, and the wool peels off; in the extreme of the disease, a swelling under the throat: When they have this disease, they die instantly when put to turnips. The disease resembles the jaundice in the human species, the liver being affected and full of insects like flounders.—Remedy; when suspected, put to dry food. Owing to black gravelly land where pennyroyal grows, by pond sides, and gravel pits, and water

flowing over land ; the vale of Aylesbury rots in two months.

2. Staggers—Seized with a vertigo, keep turning round and die in a few days ; lambs so, called poddery :—No cure. When killed, break off the horn, large maggots like grubs are found at the root of the horn and skull.

3. Redwater—Seized suddenly with it and go off immediately : bloody urine supposed from noxious herbs, or to white frosty mornings in the autumn, or to the dew damp.

4 Scab—A sort of surfiet resembling the itch insects; proceeds from poverty, over driving, thick folding, heat, insects ; cured by rubbing in tobacco water ; if not, all the fleece peels off. The tobacco water must be rubbed in when the fleece is dry.

5. Foot rot—From wet pastures, soreness between the claws ; apply a little turpentine. It is catching, owing to heat, suckling, houses, hot dung, on wet ground not more than dry. When very bad they crawl on their knees.

6. Fly-struck, or maggot—Proceeds from being fly-blown ; if not taken immediately will eat into the entrails in 24 hours. Cure, corrosive,

sublimate and turpentine dropped in between the wool and rubbed in.

7. WHITE WATER—The same as the red, except in color.

How many acres will maintain a given number of Sheep?

FOR stock sheep, 100 will require 5 acres of turnips and 15 clover—inclosed pasture if good will also carry 6 to an acre. A folding flock of 500 without common land, good dry land 50 acres of turnips, 5 loads of hay, 100 acres of clover.

What quantity of hay to an hundred?

NONE used except in very hard weather when we cannot get at turnips.

How many acres will a given stock fold?

A SQUARE yard to each sheep per night, but in some countries two nights in a place, 300 sheep give 261 yards in a night average.

What is the annual loss per hundred?

FIVE per cent. about.

When are sheep shorn, and what price of fleece?

AT midsummer. The shorter the wool the dearer.

What precautions are used in putting ewes and lambs in clover?

NONE, but not to turn them in with quite empty stomachs.

I MENTIONED that there was no disadvantage in small sheep, that they eat in proportion to their size, where the breeds were equally good. I also added, that it appeared to me that the merinos were more thrifty than the common sheep. The following experiments made by Mr. Young, will elucidate this. He put up four rams of the following breeds.

No. 1. Bakewell, weight alive, 132 lb.
No. 2. A shearling South-down, 132 lb.
No. 3. Norfolk eight broad teeth, 144 lb.
No. 4. A merino, do. 91 lb.

In eleven days they eat as follows :

No. 1. Cabbage 66 lb. bran 2 $\frac{1}{2}$ pecks, chaff $\frac{1}{2}$ peck, barley meal $\frac{3}{4}$ peck.

No. 2. Cabbage 75 lb. bran 2 $\frac{1}{2}$ pecks, barley meal $\frac{3}{4}$ of a peck and 1 $\frac{1}{4}$ pint, chaff 1 peck.

No. 3. Cabbage 84 $\frac{1}{3}$ lb. bran 3 pecks, barley meal $\frac{3}{4}$ peck and 1 pint, chaff 1 peck.

No. 4. Cabbage 49 lb. bran 2 pecks, barley meal $\frac{1}{2}$ peck, chaff $\frac{1}{4}$ peck.

This reduced to the value by a scale that he gives, stood thus :

No. 1. Bakewell sheep eat - - 52 $\frac{1}{2}$
No. 2. South-down, - - - - 52 $\frac{3}{4}$
No. 3. Norfolk, - - - - - 63
No. 4. Merino, - - - - - - 38

THUS it appears that *three* merinos may be maintained 4 per cent. cheaper than *two* of the celebrated South-downs. The fleeces of the merinos

would in England be worth 16*s.* sterling each, or 48*s.* for the three, the *two* South-downs at the highest rate of wool and price at 12*s*8, and nearly as cheap as two Bakewells, tho' in this experiment the Bakewell is 14 per cent. better than the South-down, the next best sheep in England. But what is more remarkable, the merino also gained more flesh, with less food than the other sheep with which he was compared in another set of experiments mentioned above.

LETTER

ON THE CULTIVATION OF HEMP.

By WILLIAM THOMPSON, Esq.

GOSHEN, *November 30th*, 1803.

DEAR SIR,

MY absence from home, and some inquiries I found it necessary to make respecting the culture of hemp (having but lately commenced the business myself) before I could answer you fully on the subject of your favor of the 5th ult. has occasioned the delay of my not answering you sooner. The importance of encouraging the raising of hemp in this country, and particularly in the western part of this state, where I am persuaded many large tracts of land, well adapted to the culture of that valuable article, are to be found, and which is almost the

only article that will bear the expense of transportation from those remote parts, induces me with cheerfulness to give you every information in my power to enable you to inform those who are desirous of undertaking the business.

The land in this county generally made use of for the raising of hemp, is our sunken swamps and bog-meadows, of which we have a number, and many of large extent, the loose black soil of which is frequently from 2 to 10 feet deep, before you reach the clay; this we find of importance, in order to lay the lands sufficiently dry. When we commence the draining of one of those pieces of land we begin by removing all obstructions in the outlet, and frequently cutting through old beaver-dams, and clearing out the creek, or cutting a sufficient new ditch, wide enough, if possible, to carry the whole stream in the time of a freshet, and to lay the water from 2 to 3 feet below the surface, when the freshet is over; for we find that hemp is an article that will by no means bear overflowing, and does not succeed well unless you can keep the water in your ditches at least two feet below the surface. After your main outlet is compleated, your swamp must be ditched into small lots, of from 2 to 5, 6 or 7 acres, and generally long and narrow; and if there are any springs, they must be led off by a ditch, and it requires generally a shore ditch, to be cut a small distance from the shore, across the heads of the lots, to carry off the land springs. The division ditches

are generally 4 or 5 feet wide, and about 2½ feet deep. The fall or spring after our lands are thus drained, and the ground a little settled, we begin to clear, by cutting up the bogs, hassacks and bunches of elders, &c. The most effectual way of doing which is to cut them up by the roots, and may be easily done, if you have proper instruments for the purpose. Besides the bog-hoe, which is in common use, we have two instruments, one called the bog-hook and the other the bog-knife—the hook is from 20 to 24 inches long, about as crooked as a common scythe, but wider, made very thick and substantial in the back, with a strong round eye twisted a little upwards, so that the edge lies flat on the ground, when a man holding the handle stands half erect. With this instrument, if properly and substantially made, a man, acquainted with using it, will be able to cut more in a day than two or three men with the common bog-hoe, and with more ease to himself. The bog-knife is an instrument, in my opinion, preferable to the bog-hook; it is made about 20 or 22 inches long, and about 5 inches broad, and round at the point; it is laid all around with the best of steel, and in plating it out it is left thicker in the middle to give it sufficient strength. At the other end is made a strong tine with a hole punched through it to fasten it on a strong handle in the same manner of the common pitchfork; the tine is bent a little upwards, and the instrument made a little crooked, so that a man strikes horizontally with it when he stands half erect. With

this instrument, if you cannot cut off a bog or hassack at the first stroke, you may generally do it with a back handed stroke without moving from the spot. With those instruments saplings, as thick as a man's leg, may be taken up with great facility. When the ground is thus cleared in the month of May, when the weather is pretty dry and warm, the bogs will be dry enough to burn in eight or ten days, when they may be heaped and burnt. The ground may then be ploughed, the share and coulter being ground sharp, and well harrowed with an iron tooth harrow till it is sufficiently mellow. The time for sowing old land is generally from the middle till the last of May, depending on the dryness of the season; but I have known new lands, and sometimes old, in wet seasons, sowed as late as the middle and even the last of June, and still produced good crops. It is common to sow about 1 $\frac{1}{2}$ bushels of seed to the acre, if the seed is good. If the hemp is thrifty and sowed in season, it is generally fit to cut about the middle of August, and is often from 5 to 8 feet high. It requires a little judgment in determining the proper time for cutting, but a little experience will be sufficient to inform the observer. The male hemp shoots out in sundry small branches at the top, and appears to bear a small blossom hardly perceivable, and when nearly fit to cut turns a pale yellowish color, and when stirred by the wind emits a dust, which, in the morning, will appear like a faint fog rising from it, and the leaves for some distance up the stalk will begin to

fall off. If let stand too long, the male hemp dies, the stalk turns blackish, and will yield but little coat. When the hemp is fit for cutting, the instrument made use of for that purpose is called a hemp-hook. It is made by our common blacksmiths, something shaped like a sickle, but not so crooked; the edge is smooth, and ought to be made of the best of steel; the blade is better than an inch broad, made thin, and holds its width to the point. There is a small set of about an inch, just where the tine is formed, that goes into the handle, in order to set the edge a little lower, to prevent the cutter from being obliged to stoop too much in the act of cutting. There is a considerable art in cutting hemp, which is acquired by use. The hemp is cut close to the ground, and supported and gathered with the left arm, and the length of the knife across the swath generally collects enough to spread at a time, which is carefully done by the cutter in the manner you spread flax when pulled. If the weather proves dry, the hemp will get dried through in 6 or 8 days, and then is forked up into small bundles about the size of rye sheafs, and bound with the hemp, and then carefully stacked in the field until about Christmas, when it is opened and carefully spread on the snow, and if a foot deep the better, and by other snows falling on it, it is bleached, and makes the hemp appear of a bright silver color when dressed. When the snows dissolve, in the month of March, the hemp will generally be found sufficiently rotted, and must then be taken

up, and set up loose in stacks about the size of corn-top stalks in the field, and when sufficiently dry, which will soon be the case, you may proceed to break it through the coarse break, which is carried from stack to stack for that purpose, and the hemp, thus rough broke, is carefully carried in each evening and laid away in the barn till you proceed to break it over in the fine break, and dress it for market. The coarse break is made in the form of the common flax breaks, about 4 feet 4 inches long, the slats are placed 7 inches a part in the back and 5 in the front, and the common flax break will answer for the second operation. With respect to the method of clearing the hemp of the shives, that is performed with a wooden knife, similar to that used for clearing of flax, but the shives are rather shook out with the point of the knive than by striking it hard, as that would tend to waste the hemp, and not expedite the business. After it is properly cleared of the shives, and rolled up in handfulls, like dressed flax, the loose ends are laid together in bundles from 50 to 100 weight, and then well bound round in three or four places with strong cords made of the hemp tow, and so sent off to market. The produce of an acre of land is estimated at from 4 to 600 weight; and good land, completely cleared, may be put out for one half of the crop, prepared for market, for the use of the land, which will often neat a profit of from 15 to 20 dollars the acre. Our lands appear inexhaustible; some have been in constant use upwards of 20 years, and yet

produce well. If we find they begin to fail a little, by scattering over from 20 to 25 bushels of ashes to the acre, they appear to produce as well as ever; and some persons are in the habit of sprinkling over from 10 to 20 bushels of ashes yearly, where the lands do not appear to fail, as they say they are amply compensated in the superior quality of the coat of the hemp.

Thus, Sir, I have endeavored to answer your several enquiries, and to give as perfect an account as I am able at present of the kind of land, and the mode of draining, clearing and sowing it; and of cutting, rotting, clearing and putting up for market, the hemp raised in this part of the country. Yet, I don't hesitate to say that, in my opinion, many improvements may be made. I have no doubt, that where a person has a conveniency for erecting a small dam, and could let the water in and out at his pleasure, it would be to his advantage to water-rot his hemp, in preference to rotting it in the common mode. The water-rotted hemp is of a lighter color, and perhaps stronger; however, it is preferred by the rope-maker, perhaps because he can bury more tar in it in the manufacturing of it into cordage, which he sells by the pound at the same rate. But where a person has not the conveniency of erecting a dam, as above described, the extra. labour it would take to water-rot it, would make the common mode the preferable, while labor remains as high as it now is. I am also of opinion, that a great saving

might be made, by erecting a mill or some proper machine for breaking of hemp; the common mode is not only laborious, but slow; and I believe, by breaking the stalk short in the common break is apt to injure the coat. I should suppose, if it could be mashed or bruised flat in the first process, would be much preferable.

I HAVE not the least doubt, that the flats on the Genesee and Tioga rivers, and many other tracts in the western country, would produce hemp of the first quality, and in great abundance, provided it was not injured by the overflowing of the rivers after the hemp had started. Should the people of the western country go largely into the raising of hemp, they would find their account in it to erect rope-walks, and manufacture it into cordage, as they would find it much safer and more convenient to transport the cordage to market than the hemp, as hemp is soon injured by wet, and very difficult to dry when wet, besides the manufactures could be supported at half the expense in a country abounding in provisions.

I am, with great esteem,
Your humble servant,
W. THOMPSON.

SIMEON DEWITT, *Esquire.*

ON THE CULTURE OF HEMP.

In a letter from JAMES GEDDES, Esquire, of ONONDAGA COUNTY, *to E. L'HOMMEDIEU, Vice Pres. of the Society.*

ONONDAGA, *March 6th,* 1803.

SIR,

ACCORDING to your request, I send you the result of my observations and enquiries on raising hemp.

SOIL.—The soil must be very loose and light, and of the very first quality, or it will not, in its natural state, produce good hemp. And it ought then (though new) to be prepared the season before, with a good crop of turnips, potatoes or Indian corn. There is a great deal of land in the lake country, which has the appearance of a good hemp soil; and our warm moist seasons, which we call good corn years, will be likewise good hemp years. The humidity of our atmosphere will, if we can have a sufficient degree of warmth with it in the months of May and June, be very favorable to the growth of hemp. Notwithstanding the similarity of hemp to flax in every other respect, it differs from it in growing well on the same ground, for several years successively, without manure, if the soil be good. As to a soil for hemp, "It is wor-"thy of observation, as a fact established by much "experience, that under proper clover and plaister "management, the poorest soil, if not too wet and

" heavy, may be improved into the best hemp " lands, much to the profit of the cultivator: The " produce will leave in his hands a very high com- " pensation for his labor and expense, and a ten- " fold increase in the value of his land. But it " must be observed, that the best methods of in- " creasing manure, by stabling and littering cattle, " must be attended to."

PRODUCE.—Hemp in length from 6 to 8 feet, with many and small stalks, is considered the best growth, and will, in some extraordinary cases, yield 1000 lb. per acre; 500 lb. is a bad crop; 700 or 800 lb. are good crops.

CULTIVATION.—After having received the preparation the year before, as above, and all the intended manure, if any is bestowed, the ground must receive a very late ploughing in the fall, another ploughing very early in the spring—soon after well harrowed—ploughed again in the first and second weeks of May, and then sown—From a bushel to a bushel and a half of seed per acre—The best soil the most seed. If too much seed is sown on the ground, " there is no other disadvantage than the " loss of a part of it; for though too large a growth " may start, a part of it will immediately fall back, " and after a few good growing days cannot be dis- " cerned." One-third of an acre of the best hemp is a great day's labor in pulling. The earth should be well shaken from the roots. Each hand pulls a

strip in breadth equal to the length of the hemp, which ought to be spread as thin and even as possible. Some days after the hemp must be taken up, and bound in sheaves of 6 or 8 inches in diameter, and set up in shocks for more thorough drying—then put into large stacks until the latter end of December, when it must be spread out thin and even for watering. In the spring, particular attention must be paid to taking it up as soon as sufficiently watered; for longer watering will weaken the filament, and increase the loss in breaking. Winter watering of hemp, under snow, is much preferable to summer watering. If hemp is of a good quality, it requires ordinary skill and labor to break 100 lb. a day. Hemp-seed is procured by leaving, at the time of pulling, the strongest stalks of female hemp around the edges of the field, or where the hemp stands thinnest. But seed is best cultivated by planting seeds inside of fences, near barn yards, where the ground is in greatest part manure. The seed ripens very irregularly on the same stalk; and part will remain too green when a part begins to fall out, or be destroyed by birds, and ought to be cut as soon as the greatest part becomes ripe. The price of hemp-seed, in Pennsylvania, varies from 1 dol. 25 cents to 3 dollars per bushel—generally about 2 dollars.

RULES FOR KNOWING WHEN

To pull.—Hemp is fit to pull when the leaves begin to turn yellow and fall off, and the farina to arise freely from the male stalks.

To take up, when dried.—It is sufficiently dry to take up, after pulling, when the leaves fall off, the stalks rattle and have no appearance of moisture.

To take up, when watered.—When hemp is sufficiently watered, and becomes dry, the stalks warp, the outer covering of the stalks becomes blackish, the stalks brittle, and the filaments readily separate from them.

MANURING.—Hemp ground is manured with clover, gypsum and stable dung. Let the land first be put in good order and sown with wheat; then early next spring while heaving frosts may yet be expected, sow on each acre 4, 5 or 6 quarts of clover seed, and in April about 1 bushel of gypsum, this will afford a crop of clover, doubtless, far more abundant and profitable for manure, than was expected by the original conceiver of the plan.—Neither cattle nor the scythe must enter the field this season. Next spring, sometime in April, about another bushel of gypsum must be put on each acre, and if the object is merely manuring, it must not be mowed and but little pastured. But if the trouble will be taken to mow the clover, and feed the hay to stabled and well littered cattle, the manure thus produced will more improve the land

than if the clover is suffered to rot in the field.—Late in the fall let the field be ploughed down to prepare for the hemp seed the next spring. This process will make an astonishing improvement in the soil. As a preparative for hemp, clover is found to be peculiarly effective, especially if it be so thick sown as to prevent the growth of other grass. Gypsum is used likewise by wetting and rolling the seed in it : And by sowing the gypsum on the hemp when a few inches out of the ground ; using about a bushel to an acre on common soil. Some hemp raisers use a rotation of the crops of hemp, wheat (or winter barley) and clover with two fields, putting in hemp two years successively ; while others have three fields, which gives them a hemp crop every year without raising it from the same field two years successively.

I am, Sir, respectfully,
Your humble servant,
JAS. GEDDES.

N. B. The passages marked with quotations, are from a letter written me by WILLIAM ADDAMS, Esq. an intelligent friend of mine in Berks county, Pennsylvania.

ESSAY

ON THE CULTURE OF THE VINE.

By the Reverend JOHN B. JOHNSON.

THE regions of the earth, favorable to the growth of the vine, extend, according to some, forty-nine degrees; according to others, from the twenty-fifth to the forty-ninth degree, on both sides of the equator. In either case, the United States, lying between the thirty-first and forty-seventh degree, is wholly included within the vinous latitude. This fact, as it opens a most agreeable prospect, ought to prompt and encourage American husbandmen to make careful, repeated, persevering attempts to introduce and cultivate the heart-cheering grape.

THE first object which naturally suggests itself to the man, who wishes to bring to perfection the culture of the vine, is the situation and soil most proper for a vineyard. Every sound judgment will immediately declare in favor of an *airy* and *sunny* situation. Grounds, *gently declining;* the *sides of hills and mountains* which have a *southern* exposure, ought to be preferred. It is said, the higher the vineyard, the richer the vine. The shelter of a good fence, or thick grove, to the north, should also be sought, in order to assuage the keenness of the winds from that quarter.

The best soils, are the rich, light, and warm, free from springs and excessive moisture. A rich mould mixed with sand, is highly recommended, as producing the sweetest grapes and strongest wines. Avoid a stiff and clayey soil, which will require a vast deal of pains and expense, before it can be rendered sufficiently mellow and light for your purpose. All soils, which are liable to receive and lodge drains of water, make the grape insipid and the wine weak; for which reason flat lands and the bottom of vallies seldom produce good wines, except in dry seasons. Of *whatever nature* the soil be, it must be *well mellowed* by repeated ploughings and harrowings, so as to be kept loose and light. The more loose and light it is kept, the better it will be prepared to receive virtue from the air and sun, and communicate it to the root for the nourishment of the plant. Before we dismiss this part of the subject, it will be proper to add, that a rich warm soil, mixed with gravel, or a sandy mould interspersed with large stones, or with small rocks, is also very proper for a vineyard. Rocks and stones, if the soil be good, warm and dry, are no disadvantages to vines. On the contrary, they tend to keep the earth comfortably moist, which is favorable to the roots, and they reflect great heat to the fruit, thus contributing to the perfection of the wine. It is true they make it more difficult to work the vineyard, but upon steep declivities they are absolutely necessary. They serve to make low rough walls along the lower side of the vines to preserve the

good soil from washing away. For as it is necessary to keep the soil loose and mellow, it would all wash away with hard rains, if not prevented by some such means. Again, such lands are cheap, being unfit for other purposes, and generally yielding little timber or grass. They may therefore be purchased by poor people, who could not afford to pay for good lands. Lastly, these steep hills and mountains always yield the finest grapes and richest wines, the value and price of which will compensate for any extraordinary labor.

If your ground be worn and out of heart, it must be renewed and helped with dung; with fresh mould; with creek-mud mellowed by heat and frost; with the rich soil that lodges along the sides of brooks and rivers, or that settles in low places at the foot of hills and mountains; with foddering cattle and sheep upon it; or by any other method which will answer the purpose and suit the owner.

If your ground be stiff, it may be mended by a good store of sand, ashes, soot, the rubbish and mortar of old buildings, well pounded, especially if such mortar be made of lime and sand; by the dust and small coal of coal-kilns, and the earth that they are covered with, when they are burnt: sea sand or fine gravel, and plenty of fowl's and sheep's dung, or the old dung of neat cattle.

Having thus selected and prepared the ground, the next object will be the most proper kinds of vines to make choice of, for planting. And here indulgent nature has poured forth her bounties with a truly liberal hand. There are above a hundred different sorts growing at Welbeck, England : fifty of which sorts are particularly described by Speechly in his treatise on the vine. In this country, especially in the northern states, the most hardy, and the earliest ripe are to be preferred.

The twelve following kinds ripen early in September, and will answer very well for this state : viz.

1 The black Auvernat, } *These four make*
2 The black Orleans, } *the best Burgundy.*
3 The blue cluster, } *the best Burgundy.*
4 The miller grape. } *the best Burgundy.*
5 The black Hamburg,
6 The red do.
7 The white Muscadin,
8 The Muscadella,
9 The Melie blanc,
10 The white Morillon,
11 The white Auvernat,
12 The grey, do.

The seven following kinds, ripen also in September, but they are more tender, and should occupy the warmer parts of the vineyard : viz.

1 The Chasselas Blanc, called the royal Muscadine,
2 The Malvois or Malmsey,
3 The grey Frontiniac,
4 The red, do.
5 The black Lisbon,
6 The white, do.
7 The Chasselas Noir.

Here are 19 different sorts, which we would earnestly recommend for trial ; especially the 12 first mentioned, possessed of most hardihood.

We might easily increase the variety which would answer this climate, by importations from that part of Europe, nearest the northern limitation of the vinous latitudes. What kinds are generally cultivated near Albany, New-York, in Pennsylvania, and other parts of America, I have not been able to learn ; probably, some of those mentioned above. The states south of Pennsylvania, may expect to succeed in the cultivation of a still greater variety, in consequence of the longer continuance of their warm and mild weather.

We are now brought to enquire, what part of the vine, should be selected for planting. Take care to avoid all branches that have not borne fruit, all suckers, nephews, lateral, and secondary branches, and especially the long running barren branches. *Choose your cuttings from the teeming part of the*

vine, and among these, such as are short jointed; so shall you be sure to have thrifty and fruitful vines. Let them be cut down close to the old wood, for here the wood is ripest and most firm, the upper part of the same branch is less ripe, and more loose and spungy, and more apt to fail, and makes a less firm and lasting vine.

Anciently it appears, that a part of the *old wood* was cut off with the shoot intended for planting, a little *above* and *below* the place of its insertion; so that when properly prepared for planting, a vine cutting resembled a little mallet, and was called by the Romans, *malleolus*. The cuttings, according to this practice, were about 14 or 16 inches long. In Madeira, also, even at this day, the slips or cuttings are from 18 to 24 inches. But from late experiments made in England, and from the practice of American vinerons, it appears more eligible to make the cuttings about 4 or 5 inches—*always observing the rule, that they be taken from fruit-bearing branches, that they be firm, sound, full and of a healthy appearance, thick set with eyes, and the nearer the last year's growth, the better.*

These cuttings should be separated from the mother vine, according to some, in October, according to others, in March or April. In the former case, if they are not to be planted till spring, it will be necessary to secure them during the intervening winter.

The best method of preserving the cuttings during the winter, is as follows: In the warmest part of your garden, or vineyard, dig a small trench, a foot deep and wide, and so long that it may contain all your branches. (The branches, you will observe, are still of their natural length, as when they were separated from the mother vine; not being to be cut, into the proper length of slips or cuttings, until they are to be planted.) In this trench, plant them thick and close, with the butt ends down, drawing over them, and pressing well down, with your hand, the ground, all about the bottom of the branches. Let the dirt rise 2 or 3 inches above the surface of the ground, to prevent the water from settling about the vines, which would rot them. You ought also to label them, that when you come to plant them you may be able to distinguish kind from kind, and to dispose most favorably of each. The upper parts of these branches should be laid upon a pole, about 3 feet from the ditch, so as that they may be supported at 2 or 3 feet from the ground, which keeps them from growing mouldy and from rotting. The vines then are covered with straw, laid lengthways upon them, so as to reach a little *beyond the trench*. Thus, by this straw roof, the water is carried off beyond the foot of the vines. But let not the straw be laid on too thick, lest it continue moist too long, and occasion mouldiness. Fasten a pole across the top and bottom, to prevent the straw from blowing away.

The best time of planting, according to some, is the vernal, according to others, the autumnal season. In the island of Madeira, from the middle of November to the end of February will answer. In the spring, with us, the months of April or May are best; in the fall, October and November. It is the opinion of many, that in America, the fall is preferable. However, *both seasons are nearly the same* for this purpose; and therefore each person may be regulated according to his own views, or conveniency. The vines should, however, whether planted or not, be secured from the wintry frosts.

The ground being in fine order, prepare your shoots for planting, by cutting them to the length you wish, according to the foregoing directions—always preferring the lower part of the shoot which grew nearest the old wood. If you have plenty of cuttings, it will be best to take only the lowest for your purpose; however, if you have chosen the best branches, you may have four or five good cuttings from a branch three feet long. You should use a sharp knife, and cut the thick end of the plant horizontal, the upper end oblique, about half an inch above the eye.

The shoots should be planted at the distance of 8, 10 or 12 feet apart every way, and placed neither in a perpendicular nor horizontal, but an inclined position, leaving the upper bud, or eye, nearly as low as the surface of the soil. When covered, the

earth should be pressed upon them with the foot, (always careful not to injure nor touch the eye) and other loose earth should then be drawn over them, a little higher than the adjoining ground, lest the rain, settling upon them, should cause them to decay. If planted in the fall, the shoot must be preserved from the wintry cold, by straw or hay, well littered, or by course light stable manure. Even, in the spring, the bud, or eye, near the surface, should also be slightly covered over with loose soil, which will preserve it from nocturnal frosts, in the early part of the spring, and will not be unfavorable to its receiving the warmth of the sun during the day.

Remember to insert the stake, on which the shoot is to be trained, at its north end, so that the bud may be exposed as much as possible to the warmth of the sun. Now the bud will soon* begin to evolve, and put forth shoots. But, though the *upper* eye be calculated on for training, and *only one* shoot be wanted for that purpose, it is best to suffer all that appear (for frequently they spring from underneath the ground) to grow for a certain time, in order to give you an opportunity of select-

* Sometimes, indeed, the shooting does not take place till the sun has acquired great power. In this case you must, for a time, cover the tender germ, with a leaf from the fierceness of his rays. The leaf should, as you must know, be taken off during the night, and be *gradually* discontinued during the day, till the shoot be of sufficient strength to endure the summer heats.

ing the most forward and promising* shoot among them. When you are able to do this, pinch off all the rest—let not your eye pity, nor your hand spare them—all the nourishment, which the roots can convey, are wanted to ensure the health and vigor of the *chosen root*. As it advances in growth, fasten it to the sunny side of the stake ; never suffer it to be beaten about with the winds ; and pinch off its tendrils, laterals, nephews and suckers, as they appear. Here, I find Speechly differs from a practice, I have seen pursued in New-York. The laterals are, generally, broken off *close*, leaving the bud, at its insertion, exposed. The author last mentioned, and Mr. Antill also, asserts, that the main branch, in consequence, loses that full and beautiful soundness, which indicates health and vigor ; and therefore they direct that the laterals, &c. should be pinched off at the length of about four inches. This method prevents the branch trained, from assuming that flatness and deformity, which the common practice invariably effects, and must be contrary to the intentions of nature. This remark is of importance ; and attention to it, may greatly contribute, not only to the beauty, but to the strength, fertility and longevity of the vine.

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* By the most *promising* shoot, you will by no means understand, that the tallest and most aspiring is meant. These are very often slender and long jointed, little better than suckers, and generally barren. The best shoots are the roundest, short jointed, thick set with eyes—these are the most prolific.

Some thrifty shoots may rise during the first summer, to the height of 8 or 10 feet; but they ought invariably to be checked at the humble state of 3 $\frac{1}{2}$ or 4 feet, otherwise they exhaust their strength, in the production of waste wood, and suffer the head of the vine, which is destined to support the honors and burdens of many future years, to become feeble, and incapable of sustaining this important office with profit or dignity.

Here I would just mention, that some writers of respectable authority, direct that during the first summer, *all the branches, laterals, &c. should be suffered to grow*—that you have nothing to do, but to tie up the branches with soft bands to the stakes: And a manuscript in my possession, by a merchant, who resided many years in the island of Madeira, inculcates, that the vines are not to be pruned till they have been two or three years planted. This may induce some persons to make experiments in different ways. But, to me, the method first recommended, appears the most rational, and the best adapted, to form a vigorous and durable head to the vine.

Now we suppose ourselves to have passed through the summer months. In October, when the leaf begins to fall off, is the time for trimming. Some postpone this operation till spring; but if in the spring the weather becomes warm unexpectedly, the vines are apt to bleed to death. I once had

a plant which, during the first summer, rose to 8 feet (not knowing then that it ought to have been checked at 4) but trimming it too late the next spring, it bled so abundantly, that the subsequent year it did not grow two feet, notwithstanding the greatest care was bestowed upon it. October therefore appears, unequivocally, the best season for pruning: In some places a little earlier, in others a little later, as difference of latitude, variation of climate and season may demand. At this season of the year the sap is beginning to descend—the wounded branch soon heals—and the severe frosts, which would prove dangerous, through the wound, are yet at a considerable distance. The branch should be cut down to two *good* eyes, not reckoning the lowermost next the old wood, which is called the dead eye. Or, if you please, you may leave several eyes, which will furnish you, the subsequent spring, with a greater number of shoots, from which to select the *two* best.

Having now pruned your vine, you are directed, by some, to a practice, which I believe is not known among us, either in this city or New-York. It is as follows: Carefully remove the dirt about 4 inches down, from about the vine, and cut away all the upper roots which appear above that depth. These are called day roots, and must be taken away every fall, the first three years. They should not be cut off close to the body of the vine, but about a straw's breadth from it, so they shall not be so apt

to grow again. These upper or day roots greatly weaken the vine, and hinder the lower roots from extending themselves, and from firmly fixing themselves below, on which greatly depend the strength, durableness and fruitfulness of the vine. Beside, by these roots running deep, the vine is preserved from perishing in long tedious droughts. Let the foot of the vine remain open, to dry and harden, by the combined influence of the air, sun and cold—but it must be covered with the common mellow soil, when the hard frosts approach. This practice of exposure and excision must, as has been said, be repeated, at the same season, for the two subsequent years.

The only thing that remains, respecting this first year's operation, is how to secure the vines during the winter. In the city of New-York they are suffered to remain above ground in the position they were trained. In colder climates and situations, we must lay them down and cover them with earth. The head of the vine, as well as the branches, should be covered; a few inches of soil is however found sufficient to protect them during our hardest winters. Other substances, such as short dry litter, &c. might probably be used to advantage. It is said to endanger the life of the vine, to cover the *head* of it with ground. Mr. Antill lost a number by this management before he discovered the cause. The ground, he says, in warm rains, moulds, and rots the vine. Therefore he advises that the *head*

should be covered with chaff and short straw mixed, or with bog hay, or salt hay, or with horse litter that is *free from dung*, for the heat of the dung, in warm rains or muggy weather, will mould and rot the vine. The *cooler* and *dryer* it is kept, the better. Upon these principles, the branch as well as the head of the vine would be preserved better, under the last mentioned substances, than under ground, however light and mellow. Careful experiment will be the best teacher.

We have thus seen, what management the vine requires the first year. Similar must be the subsequent management. A few particular directions however shall be added.

The second year's growth should exhibit only *two* branches trained. When the mild weather of spring sets in, you uncover the vine. The good eyes will all shoot forth. Let them *all* grow to the length of about eight inches before you select the *two* most proper and promising for training. Thus you will have an opportunity of making a choice from among several. If any one branch among the whole number, appears much more thrifty than the rest, you may perhaps be tempted to save it; but let not your eye spare it: it will prove a mere thief and robber. It will draw to itself the chief nourishment of the vine, it will starve its fellow branch, and after all will bear but little fruit. You will remember the universal rule, to keep the vine hum-

ble. You will therefore check this second year's growth at about five feet, pinching off the laterals, &c. at about four inches as before directed. In the fall, when the leaf begins to drop, you will proceed to trimming the vines. Now you have two main-branches to trim. Cut them down, to within 4 or 5 good eyes of last year's wood ; deal with the day roots as before, and guard your charge against the inclemency of winter.

The third year will of course, present you, in the spring season, with two main branches, each furnished with 4 or 5 eyes. Proceed as before in the choice of the reserved shoots, training only two shoots from each branch—thus you will have four main branches this year, which will of course increase your labor, and call forth additional industry. With respect to cropping and pruning the vine, be careful always to observe such a management as shall check its aspiring nature, and keep it humble. Thus it will be more under your manual government, and better protected from winds and cold.

Nothing more need be said respecting the management of this year, than that, if you should observe considerable fruit in your vineyard, not to covet it—and therefore pinch off the little clusters. If you suffer your vines to bear at this early age, you greatly debilitate them, and shorten their existence. Their fruit also is less perfect ; and if you

suffer your curiosity or avarice to tempt you to an infraction of this rule, you will repent of it, but probably when it is too late. But as it is very natural to indulge the desire of tasting the fruit which one's own hands have raised, you are *permitted* to keep some fruit upon *each of the kinds* of vine which shew it. Thus you may gratify your taste without materially injuring your vineyard.

In the fourth year, training again two branches, from each trained branch of the previous year, you will easily perceive that you will have eight branches growing under your care. This year you proceed as before, humbling the vine, and proportioning its burdens of fruit, to its ability to bring what it bears to perfection. Many a blushing cluster will please your eye, and all will plead to be spared. But attend to the rules given in the *earlier stage* of your vineyard, it is *unable to ripen all the fruit it will generally bear ;* or if it were able, such a practice would bring on premature weakness and decay. The treatment for future years must depend upon your own judgment, which, if you shall have carefully attended for four years, to the preceding rules and regulations, cannot fail to be sufficiently enlightened.

You will be pleased to take notice, that the ground of your vineyard is to be kept continually light, mellow, airy, and in proper heart. It should not by any means become worse, after your vines

are planted, but ought yearly to improve. You are therefore to keep the ground free from weeds and grass ; which are great enemies to vines. If you have any litter, short straw and chaff, the shives of broken hemp or flax, the chaff of flax-seed, the dust and chaff of buck wheat, and the straw trod fine by horses, when it is dry, any or all of these spread over your vineyard, after it is well hoed or ploughed and harrowed, will keep down the grass and weeds, preserve the ground moist and mellow, and greatly prevent the good soil from washing away. *If this be done the first three or four years, it will greatly forward the vines*, and it will finally prepare the soil to produce good crops, by keeping it loose, airy and mellow, in which vines greatly delight.

You will easily perceive the necessity of planting a nursery when you plant your vineyard, in order that every plant that dies may have a ready and thrifty successor, and no ground go to waste. Your cuttings for the nursery, should be selected and prepared with the same care as those for the vineyard. They should be planted in even rows, at six inches distance, and the rows three feet asunder that they may be hoed and kept clean, and scatter some short straw and chaff along between the rows to keep the ground moist and the weeds down. Let the ground of your nursery be in good heart, but by no means so rich as the soil of the vineyard ; if it is, when the plants are removed into the vineyard

they will pine and dwindle, and seldom flourish and become fruitful. The reason of planting the cuttings so close, in the nursery, is to prevent their shooting their roots too far into the ground, which would render them very difficult to take up without damaging the root, and more tedious to plant out.

You ought not to plant too great a variety of vines in your vineyard, especially where you intend to make wine. A sensible writer says, that a vineyard of one acre should contain only two sorts of grapes; two acres, four sorts; if it contained three or four acres, he would choose no greater variety. But, if it contained six, eight or ten acres, an additional number might be admitted. But then the best kinds should be preferred, and those that do not come in at the same time. If this rule be not observed, you will be over-hurried in time of vintage, and run the risk of having some of the fruit spoil upon your hands. Or, if the season proved unfavorable, and some were cut off by the unfriendliness of the weather, others, which ripened later, might escape the injury. But, whatever be your choice, as to variety, be sure to plant each sort in a distinct quarter by itself.

You are also carefully directed not to hoe, dig, plough or harrow in your vineyard, nor even to walk in it, when the ground is wet—for this would only tend to bake the soil, and make it stiff, hard, &c. which you know is contrary to what a vineyard

ought to be. Neither should you disturb it, when the vine is blossoming. The reason of which will appear on reflection. Your vineyard also should be well fenced, to guard against the depredations of boys and base men, so that you may have as few obstacles as possible to your successful cultivation of the first of plants.

Before the subject is dismissed, I would call your attention to the *advantages* which may be expected from this elegant branch of husbandry. These arise from the *great longevity* of the vine, and the *large profits*, which its successful cultivation ensures.

Though the vine appear but a feeble plant, and for support must depend upon some friendly aid; yet, in strength and duration, it sometimes rivals the venerable monarch of the woods. Speechly quotes a passage from Evelyn's Sylva, where mention is made of a vine, which was grown to that bulk and woodiness as to make a *statue* of Jupiter, and *columns* in Juno's temples; and where it is farther added, that the *great doors* of the cathedral at Ravenna, are made of *vine-tree* planks, some of which are 12 feet long and 15 inches broad—that Strabo speaks of a vine 12 feet in circumference; and that Oliarus affirms, that he found many vines near the Caspian sea, the trunks of which were as big about as a man. *Speechly, p.* 235.

With respect to the *great age*, to which the vine may, under the most favorable circumstances of soil, climate and cultivation, attain, the same author mentions one, at Northallerton, in Yorkshire, supposed to be 150 years old, and which once covered a space containing 137 square yards. (p. 242.) He mentions also, from Millar's Gardiner's Dictionary, that the vineyards, in some parts of Italy, will hold good above 300 years; those of 100 years being called young. He adds also, that Pliny knew a vine in his time, which had arrived to the prodigious age of 600 years. (p. 235.) From this mass of surprizing evidence, it is extremely probable, that vineyards in this country, planted in the most friendly soil, favored by eligible situations, and nurtured with tender care, would probably be coeval, at least, with a century. How far, in this respect, does the vine surpass the various species of stone fruit known among us; which, as the peach, generally decay within a fourth part of that period! and how profitable, on this account, its cultivation!

I proceed now, to form an estimate of the *pecuniary* advantages which, a well cultivated vineyard, may be expected *annually* to afford; but here I must regret the want of sufficient data, to make an accurate calculation. However, from the facts which have occasionally come to my knowledge, I am persuaded that the profit must be very great. A gentleman in the city of New-York, planted with

vines a small yard, (about 40 feet by 60) and, in their 5th or 6th year, the grapes, which they produced, were worth, at 3*s*. the pound, 200 dollars. Speechly to whom frequent reference has been made, says that a single vine near Ilford, in Essex, had, when the grapes sold for 5*s* sterling the pound, produced about £100, annually. In Albany and New York they are generally sold from 2*s*. to 3*s*. the pound. If the quantity were increased twenty-fold, the price would not probably fall below fifty per cent. From these facts, you may be able to form a probable estimate of the yearly income, which a single acre of fruitful and well cultivated vines would produce. At a moderate calculation, it would exceed 600 dollars. That those who reside at a great distance from any city, may not, on that account, be deterred from pursuing this agreeable and profitable branch of husbandry, I am happy to mention, for their encouragement, that grapes put up in dry saw-dust or dry bran (gathered probably before they are quite ripe) are imported from Europe into this country; and that I have seen them in New-York in a state of great preservation. So that the vine-dresser might send his fruit to any part of the United State—to British America—to the West-Indies—and to other quarters of the globe. Beside, if he chose, he might turn his attention to the making and selling of wine. And it is almost certain, that it would be much more grateful and salutary, than a large portion of the *mixture*, which goes by that name, but which has been

adulterated with an infusion of disgusting, perhaps poisonous ingredients. For the method of manufacturing wines, information may be obtained from Dictionaries, and especially the Encyclopedia ; also from Winterbotham, who, in his 3d vol. (Hist. Amer.) details, what to me appears, a plain, simple and rational process. Attempts should be made to manufacture wine also from the different species of our wild American grapes. Speechly encourages such an attempt. He says, (p. 264) " Experience " proves, that *good bodied* or *generous* wines can be " made from grapes of an *austere taste*, and that " too, even before they are arrived at a state of ma- " turity : But then wine, from such crude grapes, " requires to be kept to a good age." When the vine grew wild in Sicily, the liquor which it afforded was not grateful to the taste of the inhabitants : but, under the subsequent management of art, what a delightful change ; what rare improvement, did it not sustain ! Why are not the vines of our own soil susceptible of equal improvement ? And why do we not, from their seed, produce new varieties, out of which we might select some, equal to the finest plants of Europe ? These would also possess the peculiar advantage of repelling the severe frosts of their native clime. When we reflect that the whole of our country lies within the vinous latitude, experiments faithfully made, and patiently pursued, promise the most splendid success.

My information on this subject, has been derived from authors, and from my own limited observation. I have consulted Speechly, the Encyclopedia, Winterbotham (Am. hist. vol. 3.) the 1st vol. Pennsyl. Phil. trans. which contains a very intelligent treatise by Mr. Antill, particularly adapted to this country, and certain manuscripts. From these sources, I have endeavored to collect the most valuable and necessary facts and precepts—to arrange them in proper order, and express them with the utmost plainness.

Since writing the above, I have met with Mr. Forsyth's treatise on fruit trees; which is deservedly held in the highest estimation. And as his method of training and pruning the vine, is *different from all previous practice*, I shall conclude this essay with certain extracts from his book.

Observations and experiments on training and pruning vines.—From Forsyth, p. 77.

The following is the method that I pursued with some vines which were planted against the piers of a south wall. When I took them in hand, the *fruit was so small and hard as to render it unfit to be sent to the table.* The vines were trained upright, which caused them to grow so luxuriantly that *the sap flowed into the* BRANCHES *instead of the* FRUIT.

In the year 1789 I let two strong branches grow to their full length *without topping them in the summer*. In 1790 I trained them in a *serpentine* form, leaving about thirty eyes on each shoot, which produced 120 bunches of grapes, weighing from one pound to one pound and a quarter each. *The grapes were fine and large;* while those produced from branches *of the same vine, trained and pruned in the old way, were bad natured grapes, and not above twice the size of large currants.*

More fully to prove the success attending this experiment, I next year trained five plants in the same way, allowing the shoots intended for bearing wood, to run to their *full length in summer, without topping them.* In winter (in the fall or spring in America) I trained them in a serpentine manner, so as to fill the wall as regularly as possible. They were as productive as those in the former year.

After a three years trial I thought I was warranted to follow the same practice with the whole; and in the year 1793, I gathered 378 baskets of grapes, about 3lb. weight each—the same vine having the preceding year, produced only 56 baskets of the same weight, and those so bad and ill-ripened, that they were not fit to be sent to the table.—Thus, without planting a single additional vine, this new method produced about *seven* times the quantity according to the former method.

Although the above statement may appear like an exaggeration, it is strictly within the bounds of truth. And every one who will follow the directions here given, has it in his power to prove the advantage that will accrue from this method of training. It may be proper to observe, that the shoots should be brought as near as possible from the bottom of the vine.

On Pruning.

It is to be observed, that the wood must be *strong*, or the vine will produce small bunches.—To obtain strong fine wood and large bunches, cut the branches down to three or four eyes, to have strong wood for next year. Vines bear their fruit on the wood that was produced the preceding year. If there be a great deal of old naked wood on them, as generally is the case, with some small weak shoots at the extremities, always cut them down as near to the ground as possible ; you will then *have no fruit for that year*. Or, you may cut every other shoot, leaving the old ones to produce some small grapes, as they were wont. The next year you will have plenty of fine wood, provided you take care to fasten up the strongest shoots, and pick off all the side shoots that are produced from the eyes, pinching them off with the finger and thumb, or cutting them out with a sharp penknife *close to the bud or eye ;** but never twist them ; for by twisting

* This contradicts the rule given by others. See p. 142.

them you will hurt the bud that produces the grapes next year. While you are careful to fasten the branches as they grow, never suffer them to run together in a cluster and to mat, which will infallibly ruin them for bearing the succeeding year.—Top the shoots that have been trained in a serpentine manner, as soon as the grapes come to the size of very small green peas, *a joint or two above the fruit; but never top the leading shoot, nor that which you intend should bear fruit next year.*

I SHALL now give some directions for the second year's pruning. I would never recommend the pruning of vines *till the beginning of February.** (March for America:) It is, however, very common with some, to begin pruning, soon after the fall of the leaf; but if the frost sets in before the wood is hard, in particular after wet summers and autumns, it will be very much injured. I have frequently seen it almost killed after autumnal pruning.

IN pruning, always make choice of the strongest and largest branches, leaving them *as long as you find the eyes good and plump, and the wood sound;* but, by no means leave them when they become flat; as in that case, they seldom bear fruit; and if they do, it will be very small. I never lay in any that has less than 15 and from that to 30 good eyes, according to the strength of the shoot, which will *produce two bunches from* every good eye. I have

* See page 143.

had 70 *bunches from one shoot.* The shoots that have borne fruit the preceding year should be cut out next year, except when you want to fill the wall, and the shoots are very strong. You will always get plenty of fine healthy young wood, if you are careful in pruning—therefore never leave any but fine strong wood ; always cutting at the second, third, or fourth eye ; remembering to rub the lowest bud off, and also that which comes out at the joint between the new and last year's wood. By these means, *even these shortened shoots,* will bear as much fruit as they would in the common way of pruning : Beside which, you have the long branches of last year's growth, trained also for bearing.

Mr. Forsyth invariably applies a certain composition after pruning vines, and all other species of fruit. For the invention of this composition, the British Parliament presented him with four thousand pounds ; and subsequently, it was published for the good of the nation. He first applied it as a plaister, but afterward found it answer as well, to make it of the consistence of paint, and apply it to the pruned branch, with a painter's brush. That this treatise may be rendered more perfect, and that the members of this society may have an opportunity to pursue Mr. Forsyth's system ; directions for making the composition, follow.

Mr. Forsyth's Composition.

TAKE one bushel of fresh cow-dung, half a bushel of lime rubbish of old buildings (that from the ceiling of rooms is preferable) half a bushel of wood ashes, and a sixteenth part of a bushel of pit or river sand: the three last articles are to be sifted fine before they are mixed; then work them well together with a spade, afterward with a wooden beater, until the stuff is very smooth, like fine plaister used for the ceilings of rooms. As the best way of using this composition, is found by experience to be in a liquid state, it must be reduced to the consistence of pretty thick paint, by mixing it up with a sufficient quantity of urine and soap-suds, and laid on with a painter's brush.—Then take a quantity of dry powder of wood ashes, mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin box, with holes in the top, and after the composition has been applied, as above directed, shake the powder on its surface, till the whole is covered over with it, letting it remain for half an hour, to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder, till the whole applied composition becomes a dry smooth surface.

IF any of the composition be left for a future occasion, it should be kept in a tub, or other vessel; and urine of any kind poured upon it, so as to co-

ver the surface; otherwise the atmosphere will greatly hurt the efficacy of the application.

WHERE lime rubbish of old buildings cannot be easily got, take pounded chalk, or common lime, after having been slaked a month at least.

LETTER

FROM THE HON. R. R. LIVINGSTON, TO EZRA L'HOMMEDIEU, ESQ.

Dated, Paris, 7th Nov. 1803.

DEAR SIR,

I HAVE written you two letters, but I have not had the satisfaction of learning whether they have reached you. It is probable, that by the time this finds its way to you, the agricultural society will be about to assemble, and as I shall under every circumstance feel an interest in their prosperity, I could wish to have been able to collect such information as might be useful to them: But I fear that this wish will be very imperfectly answered in what I am enabled to offer. The fact is, that the life of a public man in Paris affords very little leisure.—Business, ceremony, society, that your duty, your improvement, your pleasures lead you into, occupy every moment; and perhaps it is the only place in the world in which a man is never at a loss for something to do. I have indeed availed myself of the few days that I could be spared from Paris, to

run over Flanders, Holland, and some of the southern departments of France. I have skirted Piedmont, Switzerland and the Alps. But in travelling by post your motion is too rapid to let you examine any thing thoroughly; this applied more particularly to me who was compelled to see what I did see in the least possible time.

Instead therefore of giving you any thing like a regular detail, I will pray you to accept hasty and desultory remarks. It is however very satisfactory to be enabled to assure you, that from what I have seen, I have no reason to think that the farmers of our state, or those to the east of the Chesapeak, have much to learn from those of Europe, notwithstanding the idle boasts of travellers that visit our country.

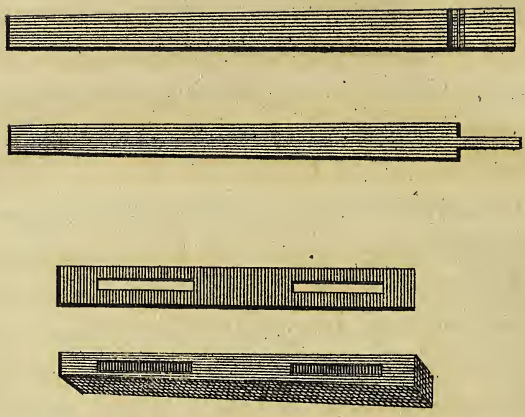
Houses.

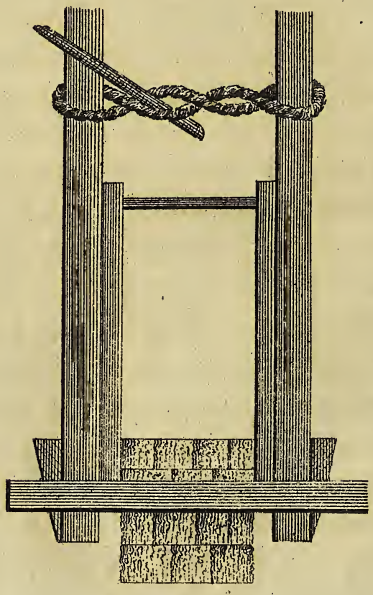
Through the greater part of France that I have visited, the houses are made of a white stone, that underlays almost the whole of the country in various directions; where this is wanting, timber, plaister, and in some few places brick is used: upon houses of this kind no observations are necessary, but those which relate to their distribution; they are generally large for farm houses, and commonly have good rooms in the second story. But what contributes to their size, is, that it is almost a universal practice to annex the stable to the house, so that the farmer goes directly from the room he lives

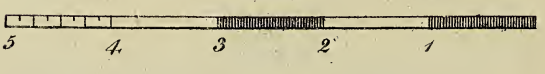
in, into that which his horses and cattle inhabit; as these are stabled (at least for the night) both summer and winter, you will easily believe that this fashion does not contribute much to neatness or cleanliness. And indeed as the French houses are all collected in villages, and those villages more irregularly built than you can well conceive, and the streets extremely narrow and encumbered with the dung of their cattle—their villages are in general very dirty; to this however there are some exceptions, particularly in Flanders, and in the new built villages. Where slate is to be got, the houses are covered with it; where it is not, which is commonly the case, they are thatched with rushes. The thatch is very thick, and extremely well laid, and would certainly make the best of roofs, were it not for the melancholy accidents by fire that it occasions; these are very frequent, and when they do happen it is seldom that a single house in a village escapes. I have seen in Franche-Comte a large extent of country, where the houses were covered with stones which are thin and flat, but not so thin as not to form a very heavy roof, when laid as these were in the manner of tile, and considering that the walls of the houses were made of the same small stone, I think it required some degree of courage to live in such shackling quarries. In the Alps, the houses are covered with shingles, put together without nails, and confined by a pole laid across every second or third layer, and kept down by flat stones. Thro' all that I saw of Piedmont, and the Pays de

Vaud, the barn and stables were annexed to the house, and in many of them, tho' large and convenient, there was no other chimney than a scuttle of boards above the roof, through which the smoke finds its way as in our wigwams. In the villages, however, chimneys were generally used.

I SHALL annex the plan of a good house, that of the post-master's which I sketched upon Mount Jura, which resembles most of those I saw in the Pays de Vaud. I have also observed in Normandy a mode of building that might be usefully practised when building stone is scarce, and brick dear.—The corners are run up with brick in the usual mode. But above and below the windows, and in other parts of the wall, which sustain the least pressure, a thin wall is built with small flat stones, over which again is a course or two of brick, on which the window frame is set, so that the wall is pannelled with brick and stone; when finished the stone is covered with mortar and some times painted; as the brick projects over the stone and plaister, it never peels or comes off, and thus forms a much handsomer front than the brick alone would do, while by this means one third of the brick are saved. But what principally leads me to touch upon the subject of farm houses, is to give you an account of the houses in the neighborhood of Lyons, and through a very extensive country where they have no good building stone; since I think it will afford a very useful hint to farmers who are in similar circumstances.



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These houses are built of earth, in the following manner. First, a stone wall is built about 18 inches or two feet high, a box is then prepared of boards roughly plained with an end piece, these are about three feet deep, kept about 14 inches apart at the bottom and top by three pieces of joist, which form a frame, and united by three other pieces of wood, which are framed into the bottom pieces, and united at the top by ropes which are drawn tight by twisting a stick in it, as is done in our hand saws. (The annexed drawing will best explain my meaning) This frame is placed upon the wall, and earth taken a foot below the surface, or any greater depth, without any other than its natural moisture, except in extreme dry weather; two men get into the frame with beetles of wood that have a sharp edge, while a third throws in the earth; they beat it together till it becomes as hard as stone, and when the box is filled they loosen the ropes, take out the joists, and move it along the wall; the corners are formed by putting in the end piece. The partition walls are made like those of the front. When the whole is finished the holes made by the joists that passed through the walls are filled up; for at every new layer, holes must be cut to admit the joist, and the joining covered with mortar; so that the whole exhibits the form of a house built of stones of three feet high and six feet long. It is not necessary to cover these houses with plaister, since they will stand the frost and rain without it; many are now standing of upwards of 100 years old, though in

general they have a thin coat of plaister, and are painted in fresco, so as to resemble in every respect very beautiful stone houses. You will be surprised, that not only the common farm houses, but most of the gentlemen's country houses, in the neighborhood of Lyons, are built in this way. That few are under two and some of them three story high, and tho' the walls are only fourteen inches (French measure) thick, are covered with tile roofs. The barns and garden walls are also built in this manner; every species of earth is proper for this work except pure sand, or pure clay; almost every admixture of one with the other in any proportions, answers the purpose. At Lyons the earth is gravel mixed with what we should call a *loam*, in the proportion of at least one half gravel. The extreme cheapness of these buildings, the facility with which they are made, their warmth, their security against fires, recommend them so strongly, that I shall make myself complete master of the art before I come over, and teach it to my countrymen; there is another way of making them, that I have seen practised, in which mode, very handsome pillars may be made for piazzas, &c. A mould is made in strong timber of the form in which you wish your stone for building, in this the earth is rammed till it becomes as hard as marble, when it dries a little, it shrinks so as to come out of the mould, though it is best to make the mould in two pieces, and confine it between strong timber, or by sinking it into the earth. Thus you have cut stone which

your hands make under a shed in rainy weather, with which you build as well as with other stone. A man will make 30 stones a day of 14 French inches square ; this, where stone is scarce and dear, may often be of use. If the mould is round, you form stones for columns, which when covered with plaister, in every respect resemble stone, and are as hard as marble; this stone will make more wall than 1000 bricks if the brick wall is 18 inches: 1000 bricks are with us, I believe, five dollars, besides the expense of cartage, and the greater quantity of lime and workmanship in building the wall; this difference will pay for giving the earthen wall a coat of plaister, which will render it as durable and more beautiful than brick.

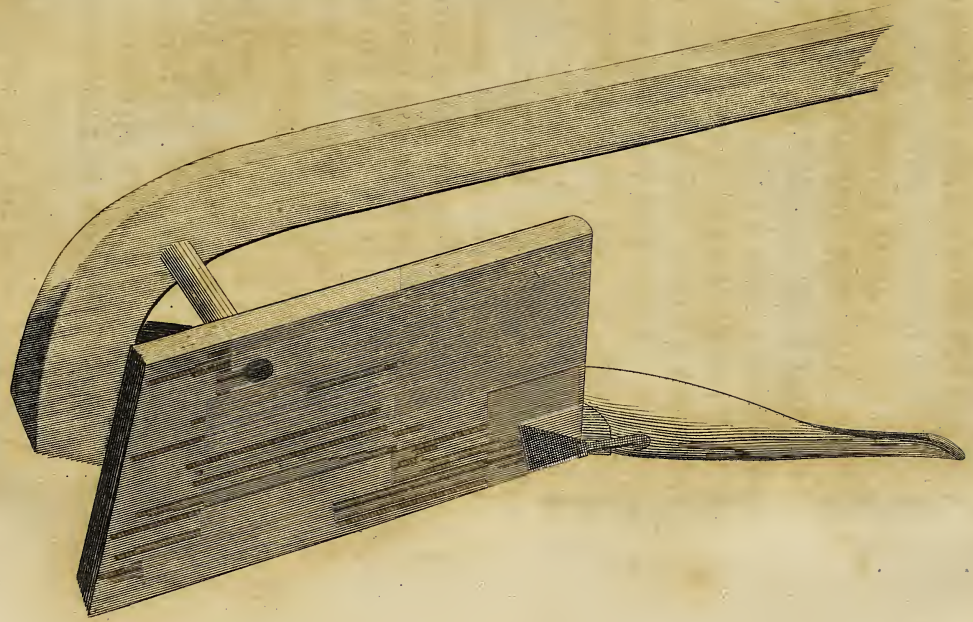
Ploughs.

With whatever plough the work is done in France, the ploughing is much more perfect than with us, nothing can be more even than the furrows, and where the soil requires it, the water furrows are well cut, cleared and drawn out occasionally with a spade or hoe. Through great part of the country, the most common plough is an enormous large wheel plough, the wheels higher than the fore wheels of our waggons, and the fin of the plough very broad ; this is drawn by three horses, commonly two to the beam, and one leader. I have seen some few foot ploughs, but they are not common ; they break up in French Flanders, and indeed in many other parts of France with a double

finned plough, which has a moveable mould board fixed on a hook at the share, and by a pin at the broad end, which passes through the mould board and into the beam; when they come to the end of the furrow, instead of making a land, they shift the mould board, which is done very quickly, and has the advantage of throwing the furrows all one way. The usual course of ploughing, is to break up with this plough; then to cross plough with the large plough; then to go over the ground with the first described plough, but with two mould boards, which leaves the land in ridges; then to split the ridges with the same plough; afterwards to lay the furrows one way, with the plough with the moveable mould board. When the side of a hill is ploughed, the furrows are not straight, but waved as the hill is, so as to prevent the water from running too rapidly and harming the furrows. The harrows are commonly of wood, but as the ground is thoroughly ploughed, and free from stone, they work very well. In the Lyonnais and many of the southern parts of France, as well as in Piedmont, oxen are generally used for the plough and other draft. They all draw by the horns, and have only a very light yoke to keep up the pole of the waggon, for they use waggons for them instead of carts.

The draft oxen are in general smaller than our Connecticut cattle, and are for the most part cream coloured or red. It is very common too, to see cows worked in the same manner as the oxen, and

A Flanders Plough, the mould-board to unship.



particularly among the Alps, and certainly is good husbandry in small dairy farms, and perhaps in any farms when harvest or seed time calls for additional teams.

Grass grounds.

Of these I have seen very little in France, the whole country in every direction that I have travelled, is under grain, except a few watered meadows upon the rivers, and in the hilly country of the Alps and Lyonnais. Artificial grasses are much less common than I had reason to expect from what I have seen written on the husbandry of this country; clover is by no means so common as it generally is in our state, since the use of gypsum; lucerne is more common, and near Paris very good; but the culture is not so extensive as I had expected, nor do I recollect to have seen more than 4 acres together any where in France. Sainfoin is cultivated upon the sandy or gravelly soils, and yields more than any other grass I am acquainted with, would do, upon the same soil; these grasses are generally broke up once in eight or nine years, when they are found greatly to have enriched the ground. In what I say of grass grounds, I should except the country upon the Loire, from Nantes nearly to Orleans, which is, without exception, the finest country I ever saw, and alike productive of grass and grain; the low or interval land extends along the river for the length of near fifty miles.

Tobacco

Is cultivated in many parts of Flanders and Brabant, but either from the climate, or not understanding the culture or the mode of curing it, it has little flavor—what I saw looked pale and sickly. It is cured not in the shade, but by hanging against the houses, at least I saw much of it in that state.

Poppies.

Poppies are cultivated throughout the whole of Flanders, in very large quantities ; they are applied to the making of oil, which approaches olive oil so nearly, as to be used for the adulteration of it without being easily detected ; all other oils, either require more or less cold than olive oil to congeal them ; that of poppies congeals at the same temperature. It certainly would be an object worthy the attention of the society to make some experiments on this culture. Since the oil is better than that which we receive from Florence, which is generally spoilt before it reaches us :—They are sown in broad-cast thin, and stand till they are quite ripe, when they are cut and put in bundles and carried home when dry.

Hemp

Is also raised through all France, tho' in general, even in Flanders, it is much smaller than ours, but then it must be considered, that it is sown very thick and supplies the place of flax, of which I have seen very little in France ; the stem of the hemp is

seldom thicker than a quill, except in Flanders, where it is larger. It is not usually broke as ours is, with the brake, but after it is rotted, the women break and strip separately every stem with their hands, which leaves the line very long and free from chips; tho' this would seem a tedious process, yet they do it very rapidly, and it employs them as they stand at their doors or walk.

Indian Corn.

A GREAT deal of it is raised in Champagne and Burgundy, but the culture does not do them great honor, whether it is owing to the soil or want of proper cultivation; I saw very little that one of our farmers would not have been ashamed of. What is very singular, it is almost a general practice to sow hemp among the corn, either promiscuously or in rows; the male hemp I presume is plucked out early, for what I saw standing among the corn the latter end of September, was all female hemp, left for seed.

Vines.

IN the neighborhood of Paris, are many vineyards, but the wine is of inferior quality. The manner of cultivating the vines, differs in different parts of France; in some places I have seen it led into fruit trees, and trained from tree to tree; in others it is kept short, and is not supported by sticks, but then the vineyard must be old, so that the stem has sufficient strength to support itself.—

The general practice in Champaigne and Burgundy, is, to suffer the vines to acquire no greater height than two feet, or two feet and a half, and to support them by small sticks; these are taken up on the autumn and laid in heaps; at this season too, the vine is trimmed, and the prunings preserved for fewel; early in the spring the ground is carefully labored, and this labor continues at different seasons in so much as to leave the vineyard always free from weeds; the sticks are then put in, and the vines tied to them by withes of osier; thro' the whole summer they are tended, the suckers plucked out, and the ends of the branches plucked off, so as to keep them at the height I have mentioned. The vines are planted in rows about three feet apart, and about two in the rows. From the little height that they are suffered to gain, I see no great trouble in covering them as they do in Germany in the winter, with a little earth, in which case they might be cultivated in the state of New-York; the severity of the winter being the only difficulty we have to encounter—my own experience at Clermont, having convinced me, that the grape looses none of its size or flavor, from being transported to us. The vineyards in the wine countries occupy much less space than you would imagine, it being the universal practice, never to place them but on the declivity of a hill; the flat ground is always applied to corn or grass; the labor they require, and the riches they impart, always produce a village or town in the neighborhood of a large vineyard.—

Nor have I ever seen from ten to forty acres of vineyard without this accompanyment. At Arbois in Franche Comte, the best wine of a particular species is made from the grape, after the frost has touched it, and so also (as I am informed by count Rumford) is the best wine made in Germany. This fact perhaps might enable us to make good wine from our frost grape, from which I have indeed made some that is now seven years old, is a strong, rich, but hard wine ; perhaps had the frost passed over the grape, might have lost this imperfection. The manner in which the wine is made differs from what I had supposed, and may be usefully communicated to those who wish to try experiments upon the grapes of our country.

The grapes when gathered are put into very large vats, without being broken or pressed ; the vats are shut up so as to be kept at a certain temperature ; here they ferment and break, the juice runs out ; this is drawn off and carried in the neighborhood of Paris, in baskets of withes (which are made so tight as to hold water) to the cask, where it undergoes a further fermentation, which is stopped at a proper period, this makes the wine of the first quality. When no more will run, men go naked into the vat, and stamp the grapes with their feet, what is drawn off from this is very inferior ; after which they press the grapes, which makes the last and worst quality, and is generally the perquisite of the *vigneron*.

It might be worth an experiment to determine what wine our grapes would produce by this process. All, I believe, who have hitherto made wine in the United States, pressed the grapes in the first instance, which would not make good wine even from the best grapes.

It might also be useful to try what the effect would be of making cyder by suffering the pumice to ferment, and separating the cider of that running from what comes off by pressure.

There are some other subjects that I would wish to touch upon, but I have not leisure to add to the length of this, in any other way than by expressing my hope, that you have not suffered the useful occupations in which you were engaged, to languish; but that the improvements of the society have kept pace with the rapid improvements of the country.

Present me respectfully to them as a body, and affectionately to my particular friends among them, and believe me,

Dear sir,
With much esteem,
Your most ob't,
Humble servant.
ROB. R. LIVINGSTON.

The hon. Mr. L'Hommedieu, *Vice-president of the Society for Agriculture, &c.*

To the President of the Society for the promotion of Agriculture, Arts and Manufactures.

SIR,

WITH great pleasure I subjoin an abstract of a letter of the 23d of Sept. last, from the honorable Robert R. Livingston, the American minister at the court of France : (having formerly had a conversation with him on the practicability of so fixing a boat, as that it would beat to windward with great expedition on the ice ; he has gratified me by an accurate description of one he saw in Holland, as a proof, that my ideas on the subject were not barely imaginary ;) supposing that the subject thereof will come within the objects of the society.

I am, sir, with every consideration
Of respect and esteem,
Your most obedient servant.
GILBERT LIVINGSTON.

POUGHKEEPSIE, *Jan.* 28, 1803.

" AT Amsterdam I saw a beautiful ice boat in the navy yard, mounted ; I took a sketch of it, from which I shall endeavor to describe it. A thick plank ten feet long was placed at each end, and upon a runner of 28 inches long, these runners were segments of a circle, being 8 inches deep at the centre, and run to a point at the board ; they were shod with iron about one third of an inch thick, and half an inch high without the wood into which it was sunk, as is usual in skates. The boat

differed in nothing from a common keel boat (tho' a flat one would be better) except that at the stern a false keel or runner was placed, turned up before, and perpendicular behind, touching only about two inches, so as to bring the boat nearly to a level when on the boards, and support her back parts; the board that was to support the front of the boat, was one third of the length from below, and directly under the mast; the rudder of the boat was of the usual form, except that the irons were reversed, as the pressure was from below, and was shod with iron, that was not however as sharp as I should have expected. The boat was 12 feet long, and was strongly fixed by a cradle and screws passing through her bottom into the board. The mast was thirty-six feet long, and supported not only by the usual stepping, but by shrouds that were fixed not to the boat, but to the ends of the planks that covered the runners. The boom was eleven feet long; by this you may judge of the size of the sail, which was increased by a foresail (or jib) the stay passing from the mast to the end of a bowsprit; both together were much more than could have been carried with safety on the water. You will easily see from the form of the runners and the few points on which they touch, that the slightest matter will steer this boat, so that it is not necessary to have the rudder very sharp.

"Boats of this kind and form will sail within two points of the wind, and they assured me that with a

moderate breeze they went thirty-six miles an hour, which I can readily believe from the sail they carry, and the little resistance they meet with ; they stop them by throwing them in the wind. They say they are not attended with the smallest danger. Indeed I cannot see how they can upset.—Snow upon the ice, unless very deep, will not prevent the use of them, tho' it may impede their velocity.

"I HAVE given you this description, my dear sir, from a belief that it would give you pleasure, and that it might be rendered useful upon our river; particularly when the ice is not strong enough to bear horses, either for the crossing a ferry, or making a journey, or even for the transportation of boards from Albany to Fishkill, during the winter, for they may be made of any size, when they are to sail only before the wind ; because in that case there would be no strain on the runners but the weight.

"IF you should find this account sufficiently important you will be pleased to send an extract of this letter to the society for useful arts, agriculture, &c. in whose prosperity I continue to interest myself."

A COMMUNICATION

TO THE SOCIETY FOR THE PROMOTION OF USEFUL ARTS, RESPECTING THE USE OF THE PLANTS OF INDIAN CORN, AS A SUBSTITUTE FOR HAY.

By Doctor ROMAYNE.

IT is often important to farmers to have a substitute for hay in dry seasons, when the ordinary crop is deficient. In the south of France, this is done by sowing indian corn, and after a growth of about 2 feet high, it is cut down and cured as hay. It is well known that the plant of indian corn requires no great quantity of moisture to favor its growth. In this state, in the month of July or even August, indian corn may be sowed on ploughed ground, and after obtaining a growth of about two feet, it may be mowed and used as ordinary hay.

ALBANY, *March* 11*th*, 1807.

LETTER

FROM R. R. LIVINGSTON, PRESIDENT OF THE SOCIETY, TO DR. DE WITT, ON THE SUBJECT OF CARRIAGE SPRINGS.

Clermont, 26*th Nov.* 1806.

DEAR SIR,

I FORGOT when I had the pleasure of seeing you, to mention an invention which might, if perfected, be rendered of very general utility. While

at Paris I ordered a carriage for the purpose of trying it, but I was called away by the sailing of my ship, before I could execute it. The object of it was to contrive some better springs for carriages, than those now in use. Every body knows the utility of springs in saving the traveller from fatigue, and the carriage from being jolted to pieces in rough roads. But it is not so generally known, that they enable a horse to go through his work with much less fatigue—could they therefore be adapted to farming carts, they would be found extremely useful. The springs of carriages now in use, are made either of wood, or iron. The first is too weak, or too clumsy; the last is not only expensive, but heavy, and liable to rust, and above all, to snap in very cold weather. Springs of either of these materials have one common and great inconvenience, that of not being able to adjust themselves to the different weights that are placed upon them. If they are so stiff as to bear a heavy burden, they have no elasticity under a light one, or if they spring under a small pressure, they break under a heavy one. This circumstance greatly limits their utility. To wood and iron I would therefore substitute the lightest, the cheapest, and the most elastick of all substances—*air*. This can never break, and its spring will always be proportioned to the weight that it acts upon. Place a carriage box upon the pistons of four brass tubes, each containing twenty inches of air. If these were four inches deep, it would require 295lb. to

sink the pistons two inches, and four times that weight, or 1180lb. to sink them three inches, and upwards of a tun weight to bring them $\frac{1}{2}$ an inch lower; in every case the spring would continue to act with a force proportionate to the pressure. If a greater motion in the spring is required, let the tubes be deeper. If 8 inches deep the motion under equal pressure, will be the double of those I have mentioned. There are various ways in which these springs may be adapted to carriages. Of these, perhaps the cheapest, and the best, would be, two planks united by leather dressed in oil, and covered with elastick gum, so as to be perfectly air tight. For a chair, four bladders soaked in oil and covered with strong leather, in the way of a foot ball, would make a cheap and excellent spring. The leather should be put on before the bladder is blown up, so that it may be smaller than the bladder, and press them strongly in every part; this would keep them from breaking or loosing any air when strained. These balls should be confined in boxes, that fit to their lower diameters, and over these the thorough braces that hold the chair should pass, and be fastened to the bars before and behind the chair; this would not only render such a carriage much lighter than those now in use, but by simplifying the machinery under it, also much cheaper. You will judge of the utility of my invention by an experiment I have already made. In travelling from Paris to Naples, we were three of us, with much baggage in my coach; my springs

were English, and of the best quality; though we travelled post with six, and sometimes eight horses, over paved and broken roads, sometimes hard frozen; they never absolutely broke, but were constantly giving way, sometimes three or four plates would crack, sometimes the iron that supported them would break, and at other times they would tear and wreck the wood to which they were fastened; scarce a day passed that we were not compelled to have some repairs made, tho' we strengthened them with cords and thin slips of wood, as much as possible. On my return from Naples, they underwent a complete repair at Rome; the defective plates were taken out and new ones put in; they were covered with wood, and the whole carefully corded, a precaution without which no iron springs will stand travelling post, a thousand or fifteen hundred miles; particularly as the postillions instead of having any mercy upon them, do all in their power to break them. When they enter or leave a town or village, the pavement of which is generally extremely broken, they snap their whips in such a way as to bring all the inhabitants to their doors and windows, and put their horses upon full gallop, to shew their address in driving. Before I got to Bologne, I found new repairs necessary, and I began to fear that no repairs would enable me to complete my journey through Germany with the same carriage. This determined me to try the following experiment. At Bologne they make foot balls of asses skin dressed in oil, and containing

some oil to keep them supple. I purchased four of these, and after covering them with calf-skin, placed them between the two folds of the thorough braces behind, and before, where the screw springs are sometimes placed. These exceeded my expectation. Tho' I travelled in the months of February and March, when the roads were at their worst, through a considerable part of Italy, through the Tirol and Germany, and through the paved roads of France, by the way of Stratsburgh to Paris, a journey of many hundred miles, not a spring gave way, nor did any part of the carriage break, tho' I found before I arrived at Munich, that the air had escaped from one of the balloons that was placed under the front spring. The motion of the coach was also much easier than it had been before the application of the foot balls.

Perhaps springs of this kind might be adjusted to saddles, so as to render the motion of a hard trotting horse as easy as that of a Narraganset. Air cushions would be admirably adapted to the seats of the common Dutch waggon. These might perhaps be made out of the stomach of an ox or horse, well tanned and dressed in oil, and blown up to $1\frac{1}{2}$ atmosphere, or 22lb. pressure upon a square inch. Nor could a lighter, or warmer coverlid for beds be contrived than silk, rendered by elastick gum impenetrable to air, and stuffed with that material. I do not think it impossible even to make beds of it. And I sincerely wish it was effected, if it was only

to relieve our poor geese from the horrible torture our luxury makes them undergo.

I am, dear sir,
With esteem,
Your most ob't humble serv't.
ROB. R. LIVINGSTON.

BENJ. DE WITT, *Esq. Secretary to the society for useful arts, &c.*

METHOD

OF PREVENTING SMUT IN WHEAT.

By EZRA L'HOMMEDIEU, Vice-president of the Society.

IN the first volume of the transactions of this society, there is a communication of experiments made in England, to prevent the smut in wheat. This has been tried in our western country to good effect. A farmer in Montgomery county informed me, that the publication had been some thousand dollars advantage to the town he lived in; they there soaked their seed wheat in lie, as recommended in the experiments published. For three years past, in the county of Suffolk, the wheat has been subject to smut, which was never known before.—The soaking the seed wheat in lie or lime water was recommended, which had a good effect, and prevented the smut the next harvest. Finding that it was usual with English farmers to soak their wheat in brine, to prevent smut, which was not

mentioned in experiments, in the communication, and which took its rise from a vessel's being stranded on the English coast, loaded with wheat, the grain was purchased by farmers for seed, as it would not answer for grinding ; and it was found that the wheat from this seed was not blasted.— This mode of soaking the seed wheat in strong brine, was also recommended to the farmers in Suffolk county ; and it has hitherto been found equally beneficial as soaking it in lie or lime water.— Soaking the seed wheat in pickle, is less trouble for the farmer, than soaking it in lie or lime water :— In many parts of the country, all farmers have not lime, and it is considerable trouble to make the lie for the purpose only of soaking the wheat, when every farmer has brine in his beef or pork barrels, which will answer all the purposes without being clarified ; and after the wheat is sufficiently soaked, the remainder will not be lost, and may be returned to the barrels from whence it was taken. If the brine is strong, 12 or 15 hours will be sufficient.— After it is taken from the brine, it will be best to spread it on a barn or other floor, and sift over it as much ashes or lime, as will be sufficient to prevent the kernels of wheat from sticking together. No doubt the plaister of Paris will be preferable where the wheat is sown out of the influence of the salt air.

DESCRIPTION

OF A LATE DISEASE IN FLAX, ON LONG-ISLAND.

By EZRA L'HOMMEDIEU, Vice-president of the Society.

ABOUT four years ago the flax in Bridgehampton and part of Southampton, in the county of Suffolk, was said to be struck with a mildew; the next year the flax was more injured, and the disorder extended at the distance of eight or ten miles; it has since extended all over the eastern part of the county, so that there is but very little flax raised.—Since I have been in this city, I am informed by persons from Richmond and Pittsfield, towns in Massachusetts, that last year the same disorder appeared among their flax. It is very extraordinary, that you cannot observe any injury done to the flax while it is yet green; but as soon as the stalk becomes dry, you see a small black speck, about the bigness of a pin's head, a little above the middle of the stalk; and in some instances, a small black streak of about half an inch or more, proceeding from the black speck. When the flax comes to the crackle or brake, all the stalks which have those black specks break off and become useless. I am fully of opinion that this disorder is no mildew, as has generally been supposed, but occasioned by some insect not yet discovered. It would be very extraordinary, that a mildew should strike the stalk of the flax only in one or two points

about the middle, and in some pieces more, and some less, and that this mildew should continue from year to year, and gradually extend further and further from the place where it was first discovered. It may be remarked, that the Hessian fly was first discovered at a place in King's county, and extended from thence year by year, at about double the distance of this mildew, as it is called. I believe these black spots on the stalks of the flax, to proceed from the sting of an insect, which lets out the sap or juice, which rots the flax in that part, and makes the streak, in many instances, from the black speck. I meant last year to have discovered this insect if any such there were; and for that purpose frequently viewed the flax in its growth, but could observe no black spots or streaks on the stalks; all looked well; I concluded my flax was not affected or injured—but on its changing colour, the black spots and streaks from the same appeared, and the crop was lost.

If this is occasioned by an insect, as I make no doubt it is, I can devise no means to prevent it.—It will, however, be worth while, critically to observe the flax in the different stages of its growth, and if possible discover the insect. The loss of the crops of flax in that part of the country, is become a serious calamity, as those lands were well calculated for that production, and large quantities were raised and exported; at present, most farmers are obliged to purchase their linen or flax from

other parts of the country, where the insect or mildew has not extended.

Albany, March 1st, 1807.

LETTER

FROM R. R. LIVINGSTON TO DR. B. DE WITT.

Clermont, 7th April, 1807.

DEAR SIR,

THE following piece of farming intelligence appears to me sufficiently important to deserve a place in our work.

MR. SMADIS, a respectable farmer at Rhinebeck, told me, that he had kept all his hogs in good order this year, upon no other food than clover hay. The hay was cut, and then boiled, and given with the liquor in which it was boiled, to his hogs. It may be proper to mention, that his hay is preserved by being salted; a quart of salt to a load of hay. His mode of making the hay, is, to cut it and leave it in wind rows about six hours, then to put it in small cocks; the next day about noon to open the cocks, and before night to ride it home, and sprinkle it with salt, in the proportion I have mentioned, which he says keeps it green and juicy all the year. He took the hint, he says, for feeding his hogs in this way, from a poor farmer in Ulster, who

desired him in the autumn to look at his hogs (I think ten in number) which he found quite fat, tho' he was assured that they had had no other food than boiled clover. He also shewed Mr. Smadis the spot on which the clover was cut, as he wanted it, which was little more than one acre. This application of clover hay appeared so new and important to me, that I thought it worth communicating. As another important piece of farming intelligence let me inform you, that I have had very good six dollar cloth, made from the wool of my *half blooded* Spanish sheep. A clothier has purchased all the wool I have, (about 80 fleeces) at the following rates : *Unwashed* (which makes at least a difference of one third in the quantity) for the full bred Spaniards, 10*f* per pound ; for the half and some three quarters mixed 5*f*6. This will bring the fleeces taken together, to at least 27*f* each ; deduct keeping and shearing 10*f*6, leaves a clear profit upon the fleece, without the lambs, 16*f*6. The profit upon a common fleece, after deducting the expense, does not exceed 3*f* even where the sheep are good of the kind, if the flock is composed as mine is of four fifths ewes.

I am, dear sir,
With esteem,
Your most ob't,
Humble serv't.
ROB. R. LIVINGSTON.

DR. BENJAMIN DE WITT.

SYNOPSIS

OF THE DIFFERENT BREEDS OF SHEEP IN BRITAIN, FURNISHED TO R. R. LIVINGSTON,

By ARTHUR NOBLE, Esq.

		lb. Fleece.	*s. d.* Price pr. *lb.*	*lb. yr.* Wether pr. qr.	Age when kill'd.
1. Dishley,	without horns, white faces and long wool.	8	10	25 2	2
2. Linconshire,		11	10	25 2	2
3. Treswater,		9	10	30 2	2
4. Dartmoor paths,		9	8	30 2	1
5. Exmoore, horned, D.		6	8	16 2	2
6. Dorsetshire, small horns,		3 1/2	2	18 3	2
7. Herefordshire, no horns, fine wool,		1 1/2	2	18 2	2
8. Southdowns do. grey faces, do.		2	2	9 1	2
9. Norfolk, large horns, black faces & legs, short w.		2 1/2	2	18 2	2
10. Leath, do. coarse wool,		3 1/2	1	5 18	3
11. Herdwick, no horns, speckled faces, short wool,		2	6	15 4	2
12. Cheviot, no horns, white faces, fine short wool,		3	11	16 4	2
13. Dunfaced, no horns, fine short wool,		1 1/2	3	7 4	2
14. Shetland, fine wool,		1 1/2	3	8 4	2

A SKETCH

OF THE TURNPIKE ROADS IN THE STATE OF NEW-YORK.

By BENJAMIN DE WITT, Secretary of the Society—Fellow of the American Academy of Arts and Sciences—Member of the Massachusetts Agricultural and Historical Societies, &c. &c.

THE progress of improvements in public highways, turnpike roads, bridges and canals, has ever been considered an interesting subject. There is an inseparable connection between these, and the agriculture, arts and commerce of a country. The condition of the former is a criterion of the advancement of the latter. The one is a natural and necessary consequence of the other. Where there is no agriculture, there are no roads; and without roads there can be but little commerce: Hence the existence of roads has been considered as a line of demarkation, between the civilized and the savage state. And hence also the excellence of public highways, marks the degree of general improvement in a country. Thus the rude essays of the early Peruvians, in constructing their celebrated great roads, has contributed to rank them amongst the civilized, instead of the savage nations: And thus the beauty and perfection of the famous Roman highways, characterised the flourishing state of that ancient empire. Thus also in our own country, the contrast between our present turnpike roads, and the dismal footpaths of the aborigines, is not

greater, than between our state of civilization and refinement, and their condition of rudeness and barbarity.

Taking into consideration the newness of our country, and the infancy of many of its settlements, the people of the United States have not been inattentive to the making of roads, and the building of bridges. Generally speaking, the progressive improvement in these things has been as rapid as the increase of our population, agriculture and commerce. Perhaps no country in the world, under similar circumstances, has done more in so short a period of time. But as it belongs peculiarly to each individual state to encourage and patronize its own domestic works of utility and convenience, every state may be considered in relation to matters of this kind as a distinct country and people Accordingly a great diversity of condition will be perceived in the different states. Some have made greater progress in one species of improvement—some in another :—Some are furnished with excellent turnpike roads—some have opened extensive canals, some have built magnificent bridges, whilst others have scarcely turned their attention to these subjects. To estimate the various exertions of the individual states—to shew what each may have done in these beneficial undertakings, and thus to furnish the means of instituting a comparative inquiry between them, would be both interesting and useful. It would excite a rival

spirit of emulation amongst them. One would receive instruction from the example of the other; and all would be benefitted by a knowledge of the progress of improvement in each. But this would be a difficult task for any one person to perform: My design in this communication is not to go beyond the limits of my native state.

WITHIN a few years past the state of New-York has undoubtedly made very rapid advances in improving and opening roads. The legislature have from time to time made liberal grants of money, drawn from the avails of lotteries and other sources, for opening new roads in the western and northern parts of the state. But so rapid has been the population of the new lands by emigrations principally from the New-England states, that all the ordinary resources were found inadequate to satisfy the demands of the country for roads. Hence the system of establishing turnpike companies was resorted to. The prospect of increasing the value of lands by the establishment of good roads—the expectation of profit from the tolls granted by the legislature, and the more fascinating project of speculating in turnpike stock, induced a large portion of the community to embark a part of their capitals for these purposes. The spirit of turnpiking consequently spread over every part of the country.—Millions were vested in stock, and the state has become covered with turnpike roads. The number of these incorporated companies, the great dis-

tance of road they are about to make, and the vast amount of capital granted to them, constitute so extensive a system of turnpiking, that important consequences are to be anticipated from it. The immediate effect of opening and improving a great extent of road, and building numerous bridges, must, without doubt, prove beneficial in a high degree to the state, inasmuch as they encourage settlements, open new channels for the transportation of produce and merchandize, increase the products of agriculture, and facilitate every species of internal commerce. But what may be the ultimate effect in a country and under a government like ours, of the establishment of these numerous incorporated companies, with large capitals, having all one common interest and object, with the privilege of exacting large contributions of toll from the community, for an unlimited period of time, remains to be determined by experiment. The succeeding statement of the several turnpike and bridge companies, with the amount of their capital stock, and the distance of road to be made, will serve to shew how far we have gone into this system, and enable every one to draw his own conclusions. It is a document which certainly furnishes a pleasing indication of the enterprize and prosperity of the people of this state; and whilst it may have a tendency to excite the emulation of our sister states, it cannot fail, I think, to be useful even to our own legislators, who, above all, ought to be minutely acquainted with the subject.

It is proper to premise that the *amount* of the capital stock of the companies, as stated, is taken from the acts of the legislature. There is reason to believe that at least the whole of that amount will be required to complete the roads; for several of the companies first incorporated, have been obliged to apply to the legislature for an increase of their stock, to enable them to finish their work.

The *distance* of road, as stated, is taken, in some instances, where the roads are already finished; such as the Albany and Schenectady, the Mohawk, the Seneca and others, from actual measurement. The distance of others is ascertained as nearly as could be by measurement on the state map, in straight lines from place to place, as designated in the laws; and of some of the short roads where the places of beginning and termination are not sufficiently marked for measurement on the map, the distance is conjectured from the number of gates permitted by law to be erected across them. On the whole, the statement will be found to be not far from the truth. It is at all events sufficiently accurate to furnish a general view of the subject.

The roads distinguished by an asterisk in the list, are either wholly or nearly finished, and the companies have received permits from the governor to erect gates and receive toll for about NINE HUNDRED MILES, as appears from the papers in his

office—many of the other companies are progressing in working their roads, and have portions of them nearly finished, but are not yet authorized to erect gates and turnpikes.

List of TOLL-BRIDGES, *with their Capital Stock.*

	CAPITAL STOCK.
Schoharie-kill bridge,	$ 10,000
Catskill,	5,000
Cayuga,	25,000
Canajoharie and Palatine,	10,000
Jericho,	10,000
Troy,	150,000
Union,	50,000
Fort-Miller,	40,000
Newtown and Bushwick,	7,500
Montgomery,	13,500
Schoharie and Cobleskill,	6,000
Fort-Hunter,	7,500
Schoharie-creek North,	5,000
Wallabought and Brooklyn,	15,000
Delaware,	20,000
Susquehannah,	20,000
Canton,	6,000
Farmers',	3,000
Cohoes,	7,500
Jefferson,	4,000
Mohawk, (stock included in Mohawk turnp.)	
	$ 415,000

List of TURNPIKE ROADS, *with the amount of the Capital Stock of the Companies, and the distance of the Roads to be made.*

	CAPITAL STOCK.	LENGTH OF ROAD.
* First Great Western turnpike road,	$ 180,000	52 miles.
* Columbia,	25,000	20
* Rensselaer and Columbia,	32,000	28
* Eastern, (with a diverg. road)	50,000	40
* First Northern,	90,000	60
* Seneca, (two roads)	177,500	112 45
* Susquehannah,	116,000	80
* Orange,	21,000	25
* Mohawk,	190,000	80
* Westchester,	25,000	10
* Newburgh and Cochechton,	80,000	60
* Chenango,	64,000	65
* Oneida,	30,000	25
* Union,	50,000	30
* Stephentown,	8,000	10
* New-Windsor and Blooming-grove,	7,500	10
* Second Great Western,	50,000	45
* Flushing and Newtown,	15,000	5
Quaker-hill,	10,000	10
* Albany and Schenectady,	140,000	14
Troy and Schenectady,	60,000	15
* Hudson branch,	20,000	10
* Ulster and Delaware,	125,000	110
* Dutchess,	60,000	35

	CAPITAL STOCK.	LENGTH OF ROAD
* Schoharie,	78,000	60 miles.
Newtown,	30,000	20
Canandaique and Bath,	50,000	35
Third Great Western,	105,000	90
* Ancram,	24,000	20
Susquehannah and Bath,	300,000	100
* Albany and Bethlehem,	30,000	5
Fall-hill turnpike and bridge,	12,500	15
* Chatham,	10,000	10
* Coxsackie,	41,000	25
Albany and Delaware,	150,000	75
Little Delaware,	100,000	60
Lake Erie,	200,000	130
Fourth Great Western,	40,000	30
* Hillsdale and Chatham,	35,000	20
Cayuga	175,000	120
Ontario and Genesee,	175,000	90
Onondaga salt spring,	100,000	55
Great Northern,	150,000	130
Delaware,	75,000	50
Newburgh and Chenango,	162,000	80
Neversink,	162,000	80
Popachton,	210,000	90
Plattsburgh and Chateaugay,	55,000	40
Utica,	30,000	30
Rome,	20,000	20
Greenfield,	26,000	20
Farmers',	100,000	35
Ulster & Delaware First branch,	40,000	25
Waterford and Whitehall,	150,000	60

	CAPITAL STOCK.	LENGTH OF ROAD.
Waterford,	60,000	40 miles.
Newburgh and New-Windsor,	5,000	5
Schenectady and Ballstown,	2,000	5
Unadilla,	62,500	40
Jamaica and Rockaway,	20,000	15
Canajoharie and Charleston,	30,000	20
Hamilton and Schaneateles,	84,000	70
Mohawk bridge and Ballston,	40,000	20
Highland,	250,000	110
New-Baltimore & Rensselaerville,	20,000	20
Mexico,	50,000	50
Middleburgh & Rensselaerville,	15,000	15
Albany and Greene,	40,000	35
67 turnpikes		
21 bridges	$5,141,750	3071 miles.
— Bridge stock as above	415,000	
88 companies.		
Total	$5,556,750	

From this statement it will be perceived that our system of road making is rendered interesting at first sight by its very magnitude. Eighty-eight incorporated turnpike road and bridge companies, with a capital of more than five millions and an half dollars, established within the period of seven years, for the purpose of building more than twenty large bridges, and making more than three thousand miles of turnpike road, whereof twenty-eight roads

may be said to be finished, comprising together a distance of NINE HUNDRED MILES of turnpike road complete, are facts that shew, in a striking manner, the great and rapid progress of the state in prosperity, in enterprize, in population, in agriculture, in commerce, in wealth, in strength, and in national resource.

THE greatest extent of road in continuation, already finished, is from the Massachusetts line, near Lebanon springs, through Albany, Schenectady and Utica, to Canandarque, in the county of Ontario, a distance of TWO HUNDRED AND THIRTY-FOUR MILES, which, with a continuation of about ninety miles more to Black-Rock, on lake Erie, to be made by the Ontario and Genesee company, will intersect the state from east to west by a line of turnpike roads, *three hundred and twenty-four miles* in length.

To give a concise view of the general course and direction of these roads, and at the same time to shew their commercial importance, let us consider the city of New-York as the centre of commerce, or the heart of the state, Hudson's river as the main artery, the turnpike roads leading from it as so many great branches extending to the extremities, from which diverge the innumerable small ramifications or common roads into the whole body and substance ; these again send off the capillary branches, or private roads, to all the individual

farms, which may be considered as the secretory organs, generating the produce and wealth of the state.

As we proceed then up the great artery of commerce, the Hudson ; the first branch we come to on the west side, is from Newburgh to Cochecton, on the Delaware, which river there divides this state from Pennsylvania. This road it is understood, will be continued westward by that state, and will open the nearest and most convenient market on the Hudson, for the agricultural produce of the northeastern part thereof. From the Newburgh and Cochecton road, diverges the Newburgh and Chenango, in a northwestern direction, through the counties of Ulster and Delaware, across the Susquehannah river at Jericho, to Oxford, in the county of Chenango, where it communicates with other great roads leading to the western counties, as will appear in the sequel.

The next great branches we come to, are, from Kingston to Jericho, in Chenango county, on the Susquehannah river ; from Kingston to the west branch of Delaware, in the town of Walton, and from Rochester, in Ulster county, to Chenango point.

As we advance up the Hudson, we meet successively, the branches of turnpikes from Catskill to Wattles' ferry, on the Susquehannah river ; from

Catskill to the mouth of little Delaware river; from the town of Coxsackie, to intersect the great western road at Cherry-valley; from the village of Coxsackie to intersect the Catskill and Susquehannah road; and from New-Baltimore to intersect the Albany and Delaware road.

We arrive next at the city of Albany, and the neighboring villages of Troy, Lansingburg and Waterford, at the head of the sloop navigation of the Hudson. Here we see a great cluster of ramifications, no less than eight turnpikes proceeding directly from the city of Albany alone, towards almost every point of the compass. The first of these I shall mention, is the Albany and Delaware, it runs in a direction a little south of west, to the town of Otego, on the Susquehannah. Here it is to be observed, that Otego, Wattles' ferry, Jericho and Chenango Point, where almost all the aforementioned roads terminate, are places on the Susquehannah river, not far from each other, and are connected together by the Unadilla turnpike.—All these roads therefore from Newburgh, Kingston, Cattskill and Albany, are to be considered as communicating with, and continued by the great road to be made from Jericho to Bath, in Steuben county, and from thence along the head of Chataughque lake to lake Erie, at the westernmost point of the state, about THREE HUNDRED AND FIFTY MILES from Hudson's river.

Another great branch from the city of Albany, is the first great western road to Cherry-valley, in Otsego county. This sends off one branch from Duanesburgh, to the Mohawk river, at Canajoharie : a second, by the second company from Cherry-valley through Cooperstown, to the Chenango river, in the town of Sherburn ; and is continued by the fourth company to the town of Fabius, in the county of Onondaga. A third branch, by the third company through the towns of Warren, Otsego, Richfield, Plainfield, Bridgewater, Sangersfield and Hamilton to Cazenovia ; thence to intersect the Seneca turnpike in Manlius, or through Pompey and Marcellus to the outlet of the Schaneateles lake. And a fourth branch from the town of Burlington, in Otsego county, to the town of Homer, in Onondaga, where it branches on the right to intersect the Seneca turnpike at the Cayuga bridge, and on the left along the head of Cayuga lake, to intersect the great road from the Susquehannah, to Bath and lake Erie.

The next great branch of turnpike road worthy of notice, is the Albany and Schenectady, continued by the Mohawk company to Utica ; from thence by the Seneca to Canandaigua, and from thence by the Ontario and Genesee to Black-Rock, on lake Erie. Of this line of roads the Mexico turnpike may be considered as a branch diverging by the public road from Utica to Rome, and extending

from Rome to the mouth of Salmon river, in the town of Mexico on lake Ontario.

Next in order are the roads from Lansingburgh and Waterford, extending northerly on each side of Hudson's river, sending off branches into the state of Vermont, and continued by the great northern road to the north line of the state at the forty-fifth degree of latitude.

And lastly, amongst these important turnpikes may be enumerated, the several roads on the east side of Hudson's river, extending eastward from Poughkeepsie, Rhinebeck, Hudson, Albany, Troy and Lansingburgh, to the states of Connecticut, Massachusetts and Vermont.

This transient review of our turnpike roads will enable us to form a competent idea of the flourishing condition of the state, and the accelerated progress of her improvements. It will enable us to estimate how far these improvements are calculated to favor the new settlements, to promote the increase of the state, and to facilitate transportation of produce and merchandize from its interior and remote parts; as well as to draw large supplies from the neighboring states. For owing to the natural advantages of our geographical position, in relation to the states of New-Jersey, Pennsylvania, Connecticut, Massachusetts and Vermont, a large portion of whose territories are nearer and more

convenient to Hudson's river, than to any other place of deposit, much of their produce must eventually take that direction; and this will be materially promoted by opening and making good roads.

LETTER,

FROM N. CROOKSHANK, ON MANURING WITH BURNT CLAY, &c.

To the honorable the president and members of the Agricultural Society of the state of New-York.

GENTLEMEN,

THOUGH I have not the honor to be connected with, nor even known to so respectable a body of citizens; I hope that a most ardent wish to promote the pursuit and improvement of agriculture, that genuine source of national happiness and independence, may in some measure apologise for my intruding upon your deliberations, with a few remarks relative to the culture of clay grounds.—I am indeed ignorant whether communications coming from any but members of your society, are either customary or agreeable to your rules. But since what I am about to communicate, may possibly lead to improvements of considerable importance to a large portion of the community; I trust the magnitude of the object will for this time excuse the singularity.

HAVING formerly resided in the northern parts of the county of Washington, where is perhaps the greatest body of clay land of any to be found in the state; and having about the same time had frequent opportunities to observe the wonderful, I had almost said miraculous effects of the plaister (gypsum) manure on the gravelly and sandy soils of the middle counties—it became a desirable object with me to discover a manure, that on the clayey soil might prove of similar, if not of equal utility. In the course of my researches, several conspicuous circumstances presented; from each of which I have at times endeavored to draw something favorable to my plan, viz. I always observed, that where large heaps of logs or brush had been burned, the grain and grass, for at least the two succeeding years, were singularly rank and thrifty, even to that degree, that I have often seen it lodged on those places, when the rest of the field seemed scarcely worth reaping. But where gravelly ground had been burned in like manner, unless it contained much clay; I as constantly observed, that the vegetation was more or less injured. I at first attributed these beneficial effects on the clay ground, to the salts contained in the ashes produced from the wood. But I was soon taught to think differently by observing the same effects where white-pine and hemlock logs had been burned, which yield very few ashes, and those containing little or no salt; and I have even scraped off the top of the ground in some of those places, removing all the

ashes and cinders, but still the crop was extraordinary, except where I took off all the clay that had become red in burning, where the burning lost most of its effects. Another circumstance I observed, was, that where clay ground had been *broken up* in autumn, and exposed to the winter's frost, it lost much of its adhesive quality: after which if it was planted or sown the ensuing season, it generally produced the best crops. This adhesive quality of clay, seems to depend upon its union in some way with an acid. For on being burned, this quality is diminished in proportion to the degree of heat employed. So far as to vitrifaction, beyond which I can say nothing relating to it. But on being dissolved in vitriolic acid, (sulphuric acid) and possibly some other acids, it recovers its ductility again. And there is certainly an acid emitted from it in burning bricks, as is evident to the smell, after a certain degree of heat has been communicated to the kiln; but of what kind this acid may be, I cannot say, tho' I have seen curriers learn to their cost, that it would stain their leather black, if by any means it happened to get mixed in sufficient quantities with the astringent juice of the oak bark used in tanning. I suspect, however, that clay contains either the sulphurous or the sulphuric acid, which only differ in their degrees of oxygenation; and that the quantity of acid is too great for the purposes of vegetation. But as some acid seems

necessary for those purposes, and as gypsum* consists of sulphuric acid and lime, it answers the most *beneficial* purpose on gravelly soils, which therefore seem to contain too little acid. That it is the *acid* that acts principally in the use of gypsum, seems still more probable from the known property of the *sulphurous* acids, to dislodge most if not all the other known acids from their earthy and metalic bases, when combined in the form of neutral salts; and that decomposition of the soil is necessary, either total or partial, in the progress of vegetation, is also probable; in that those methods of cultivation, particularly burning and freezing, and those manures that possess an anti-acid quality, as lime, ashes, &c. and consequently a power of decomposing, or at least of lessening the adhesive quality of clay, succeed best in producing good crops on that soil; while if used on gravelly soils, lime and ashes answer no good purpose, and it is even said they are hurtful, which last is a further proof that the gravelly soil contains too little acid. But I have not yet found any manure, nor method of cultivating clay land that produces such striking effects as burning. How this effects so salutary a change on the clay, I cannot positively determine; but from the above it is at least probable, that it is by diminishing the acid contained in the clay, which if true, might not burned clay,

*The manner in which the gypsum is decomposed in this case, may be by its meeting some substance for which it may have a greater attraction, and thus decomposes the soil.

burned plaister, and even quicklime pulverized answer the most beneficial purposes as manures on clay grounds ? I have made several trials of these but as my situation in life has not hitherto been such, as to allow me to make experiments either so accurate or extensive as is necessary to a complete knowledge of the subject ; I forbear to particularize them at present ; and most cheerfully submit it to the consideration of those whose abilities and conveniencies enable them to determine it with accuracy and advantage to the public.

With sentiments of respectful esteem, and wishes for the promotion of the highly commendable objects of your institution.

I am, gentlemen,
Your friend and fellow-citizen,
NATHANIEL CROOKSHANK.

P. S. It is thought by many to be owing to the poverty of the soil, that clay grounds produce such poor crops as are often experienced ; but I feel confident in asserting, that poverty forms no part of the characteristics of them. For I have often seen hard clay, thrown out of the bottom of cellars, wells, &c. after exposure to a winter's frost, produce hemp and other vegetables of extraordinary size ; and in one instance I observed like effects on a place where some pine logs had been burned, on clay recently thrown out of a well eight or ten feet deep, and all without the addition of any manure

whatever. It is a fact too scarcely to be doubted, that those grounds (soils) cannot be so readily if at all exhausted, as most of the sandy and gravelly; so that upon the whole, I feel myself fully persuaded, that if a method of tillage could once be found or a manure as advantageous to the clay, as the gypsum is to the gravelly soils, it would soon become the richest in the country.

If the foregoing cursory and imperfect hints, should induce any gentleman to prosecute the enquiry to perfection, I shall feel myself highly gratified; but especially if the result should realize the hope I once entertained, of rendering the clay grounds of the north, equally productive with the other soils in the more central parts of the state, which I cannot yet think, by any means improbable.

N. C.

ON THE CURING OF BUTTER.

By PETER GANSEVOORT, Esq.

THE art of curing butter, so as to preserve it good and sweet for any length of time, is acknowledged to be of very great importance. Strong butter spoils every kind of cookery in which it is employed, and (excepting in cases of absolute necessity) is altogether discarded from the breakfast and

the tea table. Regular supplies of fresh butter cannot be had in many places; any method to lessen the evil arising from this source, must therefore be considered as a very valuable acquisition. The English, who have carried the arts of this kind perhaps farther than any other nation, give the following recipe, as the best hitherto discovered, and from my own experience, I can give my testimony to its value. It is taken from the supplement to the American edition of the Encyclopedia, under the article *Butter*.

"TAKE two parts of the best common salt, one "part of brown sugar, and one of salt-petre; beat "them up together, and blend the whole complete-"ly together; take one ounce of this composition "to every sixteen ounces of butter, work it well "into the mass, and close it up for use." Dr. James Anderson, from whose view of the agriculture of the county of Aberdeen, this recipe is taken, says, that he knows of no simple improvement in economics greater than this is, when compared with the usual mode of curing butter by means of common salt alone. "I have seen (con-"tinues he) the experiment fairly made, of one "part of the butter made at one time, being thus "cured, and the other part cured with salt alone; "the difference was inconceivable. I should sup-"pose that, in any open market, the one would sell "for 30 per cent more than the other. The butter "cured with the mixture appears of a rich mar-

" rowy consistence and fine color, and never ac-
" quires a brittle hardness, nor tastes salt; the
" other is comparatively hard and brittle, approach-
" ing more nearly to the appearance of tallow, and
" is much salter to the taste. I have ate butter
" cured with the above composition that had been
" kept three years, and it was as sweet as it was at
" first; but it must be noted, that butter thus
" cured, requires to stand three weeks or a month
" before it is begun to be used; if it be sooner
" opened the salts are not sufficiently blended with
" it, and sometimes the coolness of the nitre will
" then be perceived, which totally disappears af-
" terwards."

The following observations respecting the proper method of keeping both milk and butter, are by the same author, and we trust may prove useful; speaking still of the county of Aberdeen, he says, " The pernicious practice of keeping milk in lead-
" en vessels, and salting butter in stone jars, begins
" to gain ground among some of the fine ladies in
" this country, as well as elsewhere, from an idea
" of cleanliness. The fact is, it is just the reverse
" of cleanliness; for, in the hands of a careful per-
" son, nothing can be more cleanly than wooden
" dishes, but, under the management of a slattern,
" they discover the secret which stone dishes in-
" deed do not. In return, these latter communi-
" cate to the butter and milk, which has been kept
" in them, a poisonous quality, which inevitably

" proves destructive to the human constitution. " To the prevalence of this practice, I have no " doubt we must attribute the frequency of palsies, " which begin to prevail so much in this kingdom; " for the well known effect of the poison of lead is " bodily debility, palsy—death!" *(Thus far the Encyclopedia.)*

I SHALL only add, that butter cured with the mixture will cost scarcely one cent on the pound more than what is done up in the common way, and I am sure no one would hesitate to give several cents more for it. I had some made both ways from the same churning in December last, and every one that has tasted it is charmed with the experiment—while that which is cured in the old way immediately discovers to the smell and the taste strong indications of age, the other is entirely free from any thing of the kind. Every one pronounces the difference to be great indeed. For my own part, I have such a high opinion of the value of this discovery, that I think it merits every degree of publicity which this society can give it.

METHOD

OF DESTROYING THE WEAVEL IN WHEAT.

By EZRA L'HOMMEDIEU, Vice-President of the Society.

THE weavel is an insect well known in the old settled parts of the country to be very destructive to wheat as well as to some other kinds of grain in the sheaf, and when put into the bin, if continued there during the summer or any considerable length of time. If they get into a barn there is no getting rid of them. I have known farmers to take up their barn floors, and take out baskets full of them, and yet, by moving the wheat in the barn, did not experience much relief by their endeavors to destroy them, and were obliged to stack their wheat at a distance from the barn. They are an insect that multiply exceedingly, and if they get into a heap or bin of wheat they soon destroy it. I was never troubled with this insect till last year. I had a bin of wheat, which I kept over the summer, and on examining it found it alive with those insects. I endeavored, by winnowing, to separate them from the wheat, but, finding that process would not answer, I desisted, and went to a miller, who I heard had been much troubled with them; he informed me, that he had tried many experiments to clear his mill, and a heap of wheat he had on hand, from them, and, on hearing that unslaked lime would destroy them, he made use of it, by mixing it with the heap of wheat, and strewing it over every part

of the mill, where he supposed it would be of any advantage, and they left the wheat and the mill in a short time. On this information, I took all the wheat out of the bin, which I white-washed, and after it was dry, put the wheat back into the same bin, adding a handful of fine unslaked lime sprinkled over every 4 or 5 bushels returned into the bin, 'till the whole was put in, and over the top was sprinkled 5 or 6 handfuls, and within 10 or 12 days the weavel all left it, there not being one to be discovered. I then used the wheat, after winnowing it, and there was no injury experienced to the wheat on account of the lime, it all blew off by winnowing with the dust made by the weavels in eating the wheat, which was very considerable. After the experiment was made, the wheat did not remain long in the bin before it was sold or used. Had it stood any considerable time after the lime was slaked and lost the effect of slaking, this experiment does not prove but they might have returned, notwithstanding the lime remaining with the wheat; but, should this be the case, 'tis only removing the wheat again, and adding unslaked lime in the manner I have before mentioned, though I should not think they will return, for a considerable time, to the bin when there is so much lime, if at all.

A SIMPLE AND EFFECTUAL METHOD

OF PREVENTING THE DESTRUCTION OF SHEEP BY WOLVES.

Communicated by EZRA L'HOMMEDIEU, Vice-President of the Society.

MR. WALTER BRIGGS, a respectable farmer in Schoharie, who keeps a large number of sheep, informs me that he loses none of them by wolves, who are plenty in that part of the country, and cannot be driven off or destroyed, except by traps. He makes an ointment, composed of gun-powder and brimstone, powdered fine, and mixed with tar and gurry or currier's oil—with this he anoints the under part of the throat of the sheep. It must be renewed as often as the ointment becomes dry or loses its moisture, which will be four or five times in a season. He says that he has lost no sheep by the wolves since he has been in this practice, and has often seen the wolves' tracks among the sheep's tracks in the fields. He has a parcel of sheep, which had been out a number of weeks, and no care taken of them, except their necks being anointed with this ointment, when he was informed by his neighbor that the sheep were at his house, and that early on Sunday morning they came running into his door-yard—he looked out of the window, and saw a wolf among them, who ran from one sheep to another, and jumped on them, but did not offer to bite any of them. The sheep were brought

home, and none of them injured by the wolf. I thought it advisable to make this communication to the Society, as many parts of our country are so infested by wolves that they are obliged to yard their sheep every night to prevent their being destroyed by those voracious animals.

CENSUS

OF THE STATE OF NEW-YORK, AT DIFFERENT PERIODS, SINCE THE YEAR 1731.

A COPY of the following census was furnished by the President, with an intimation that its insertion in the proceedings of the Society would tend to preserve an interesting document, and afford a pleasing contrast with those taken since.

THE county of Albany, at the time of taking it, comprehended all the territory of the colony north and west of Dutchess and Ulster.

Cities and counties in New-York.	*Sheriffs.*	*White males above 10.*	*White females above 10.*	*Males under 10.*	*Females under 10.*	*Males black above 10.*	*Females black above 10.*	*Males black under 10.*	*Females black under 10.*	*Total.*
Ulster county,	Joh's Wynkoop,	990	914	577	515	321	196	124	91	3728
City & county of New-York,	Henry Beekman,	2628	2250	1143	1024	599	607	186	185	8628
Suffolk county,	David Corrie,	2144	1130	2845	955	239	83	196	83	7675
Westchester county,	Gilb't Willet,	1879	1701	1054	707	269	96	176	151	6033
Kings county,	D. Vander Veer,	629	518	243	268	205	146	65	76	2150
Dutchess county,	William Synire,	573	481	263	298	59	32	13	8	1727
Queens county,	Thomas Hicks,	2239	2175	1178	1139	476	363	226	199	7995
Richmond county,	Charles Geritson,	423	571	263	256	111	98	51	44	1817
City and county of Albany,	Gosen Van Schaick,	2481	1255	2352	1212	568	185	346	174	8573
Orange county,	William Prelton,	627	534	325	299	85	47	19	33	1969
		14613	11529	10243	6673	2932	1853	1402	1044	
		11529							1402	
		10243							1853	
		6673							2932	
	Males and females white	43060						Blacks	7231	

Whites in all 43060
Blacks in all 7231
50,291 in all.

(Copy) Signed, RIP VAN DAM.

New-York, 27th Oct. 1731.

	in 1731	*in* 1771	*in* 1786	*in* 1791	*in* 1801
New-York,	8628	21163	23614	33131	60489
Suffolk,	7675	13128	13793	16440	19494
Richmond,	1817	2847	3152	3835	4563
Queens,	7995	10980	13084	16440	16893
Kings,	2150	3623	3986	4495	5740
Dutchess,	7727	22404	32636	45266	47775
Westchester,	6033	21745	20554	24003	27423
Orange,	1969	10092	14069	18492	29355
Ulster,	3728	13950	22142	29397	24855
Albany,	8573	42706	72360	75736	34043
Montgomery,			15057	28848	21700
Washington,			4456	14042	35574
Ontario,				1075	15218
Clinton and Essex,				1614	8053
Columbia,				27732	35322
Rensselaer,					30442
Saratoga,					24483
Otsego,					21636
Herkimer,					14479
Onondaga,					7406
Oneida,					22047
Cayuga,					15871
Tioga,					6879
Chenango,					15666
Steuben,					1788
Delaware,					10228
Schoharie,					9808
Rockland,					6353
Greene,					12584
Total,	50291	163338	238896	340120	586141

AN ACCOUNT

OF THE WEATHER, FOR THE YEAR 1788, AT SPRINGFIELD, IN PENNSYLVANIA, TOULOUSE; AND FOR 1801, LONDON.

Reaumur's Thermometer.	*Springfield*, 1788.	*Toulouse*, 1788.	*London*, 1801.	*Days of rain & snow Springfield.*	*Days of rain or snow Toulouse.*
Mean degree of heat.	*deg.* $\frac{1}{10}$	*deg.* $\frac{1}{10}$	*deg.* $\frac{1}{10}$		
January,	4 1	4 4	4 4	7	9
February,	1 0	8 8	3 9	4	14
March,	3 1	8 8	6 4	3	13
April,	9 0	11 4	7 2	13	5
May,	14 0	16 1	10 9	13	9
June,	17 2	16 6	13 7	9	15
July,	19 0	19 5	14 0	13	5
August,	19 4	19 2	15 1	11	7
September,	14 9	15 9	13 0	7	14
October,	9 9	11 4	9 5	8	7
November,	7 5	7 0	4 6	14	9
December,	0 9	1 2	2 9	1	4

New-York, 1797.	*Farh't. therm'r at sun rise.*	*Toulouse*, 1802, *therm'r at 7 o'clock morn.*	*N. York, therm'r at 2 o'clock even'g.*	*Toulouse*, 1802, *therm'r at 2 o'clock even'g.*
August 4	70	72	71	78
5	75	74	80	80
6	71	75	78	81
7	70	75	79	85
8	71	78	73	88
9	69	78	81	90
10	65	75	78	90
11	65	72	76	87
12	67	70	75	85
13	73	72	81	89
14	65	75	74	93
15	56	75	76	95
16	62	74	77	90
17	65	71	78	86
18	70	70	79	90
19	68	74	81	85
20	68	70	81	87
21	67	72	77	85
22	71	74	71	86
23	66	73	76	88
24	67	74	82	88
25	68	71	68	68
26	72	63	71	71
27	66	60	78	72
28	66	67	76	78
29	61	66	74	82
30	64	69	71	81
31	67	71	75	80
Sept. 1	73	71	84	85
2	76	72	87	83
3	63	72	76	83
4	63	75	73	85

The following extract from the first volume of the Transactions of the American Philosophical Society, "on the raising and dressing of hemp," by Edward Antil, Esquire, is added as a proper supplement to the Communication of William Thompson, on the same subject—page 120.

"WHOEVER would raise hemp properly and to advantage, should set aside two pieces of ground, of such dimensions each as he shall be able to cultivate every year, and sow the one whilst he is manuring and preparing the other for the succeeding year's crop; the higher and dryer the ground the better, provided it be well dunged and made strong and mellow; the ground should not be too sloping, least the good soil be washed away with hard rains; if it droops toward the south, so that it may have the full influence of the sun, it will be an advantage; low, rich, warm, dry grounds will also produce good hemp; but wet land, though never so rich, will by no means do. The ground being prepared and made very mellow, I now come to that part which must be particularly and exactly attended to, since the success of the crop greatly depends upon it. Sometime in May, the ground being moist and in a vegetating state, but by no means wet, it must be well ploughed, the furrows close and even, the soil lying light and mellow, it must be sowed very even, with two bushels of seed upon one acre; a man with an iron tooth harrow follows the sower, and harrows in the seed with

two horses without any balks, for the less the ground be trampled the better; if harrowing one way be not sufficient to cover the seed, though it would be best if that could be done, it must be cross harrowed. The ground being moist, as I said before, but by no means wet so as to clod, which would ruin the crop, the seed will all start and come up together, which is a sure sign of a good crop, and nothing after that, but too much wet, will hurt it; for hemp, thus come up, bids defiance to weeds and grass of every kind; its growth is so quick, and it so effectually shades the ground, that nothing below can rise or shew its head, and it so preserves all the moisture below, that the hotter and dryer the weather the faster it grows. Whereas if the seed be sown, when the ground is dry, the seed that lies deepest where the moisture is, will come up first, and these will shade and starve those that come after, by which means the first comers will be too large, and the last will be much too small, so that the crop will be greatly damaged every way: So much depends upon this one circumstance, of sowing the seed when the ground is moist and fit to receive it: The crop, thus rightly managed, will stand as thick as very good wheat, and be from four to six feet high, according to the strength of the ground, and the stems will not be thicker than a good wheat straw; by this means the hemp will be the finer, it will yield the greater quantity, and it may be plucked from the ground like flax, which will be a very great saving: But if it be sowed thin, that is,

one bushel to an acre, which is the common practice, it grows large, the hemp is harsh and coarse, and then it must be cut with hooks, which occasions great waste, for four or five inches just above ground is left, by way of stubble, which contains the best and heaviest part of the hemp.

"When the hemp has got its growth, and is fit to be plucked, which you will know by the under leaves of the carle, or he hemp, turning yellow and falling off, the sooner it is pulled the better; it must then be bound up with straw bands, in single band sheaves, rather small than large, and each sheaf must be bound in two places; and the sooner it is carried to the water to rot the better: Water rotted hemp, if it be rightly managed, is every way better than that which is rotted on the ground; there is less waste in it, when it comes to be dressed; it looks brighter and fairer to the eye; it is esteemed to be stronger and more durable, and it always fetches a better price; besides it is much sooner done, and it is rotted more even and alike, and with greater certainty and exactness. Many people in America are acquainted with the method of rotting hemp in water, but as many more are not yet acquainted with it, I shall, for their information, set down the method of doing it. Hemp may be rotted in stagnated or standing water, such as ponds, pools, or broad deep ditches, and in such water it is generally four or five days and nights a rotting, and sometimes longer, according to the heat or coolness of the weather; it may also be

rotted in running water, as in a brook or river; and in such water three or four days and nights are sufficient, according to the weather. To know whether the hemp be rotted enough, in either case, take a middling handful, out of the middle row, and try with both your hands to snap it asunder; if it breaks easy, it is rotted enough, but if it yet appears pretty strong, it is not, and must lie longer, till it breaks with ease, and then it must be taken out and dried as soon as possible; in handling the sheaves, take hold of the bands, and set them up on end against a fence, if one be near, or lay them down upon the grass, for the water to drain off, and then unbind them carefully, open and spread them to dry thoroughly; then bind them up again and house them in a dry tight place: The reason of handling the hemp in this careful manner is, that when it is well rotted, whilst it is wet the lint comes off with the least touch, therefore if it be handled roughly, or if, whilst it is wet, it be thrown into a cart, and carried to a distance to be unbound and dried, it would be greatly hurt, and the owner would receive great damage by it, but when it is dry, it is handled with safety.

"If the hemp be rotted in a brook or running water, the sheaves must be laid across the stream, for if they be laid down lengthways with the stream the current of the water will wash away the lint and ruin the hemp: It must be laid down heads and points, two, four or six thick, according to the depth of the water and the quantity of hemp; if the

bottom of the river be sand, gravel or mud, three good strong stakes must be driven down at each end, above and below, and three long strong poles must be laid on the hemp and fastened well to the stakes, in such manner as to force down the hemp under water, where it remains till it be rotted enough; though if a muddy stream could be avoided it would be best, because it is apt to foul and stain the hemp. If the bottom of the stream be rocky or stony, so that stakes cannot be drove down to secure the hemp under water and from floating away, then a rough wall must be made at the lower end of the hemp, and along the side to keep it in, and strong poles or rails must be laid upon the top of the hemp, and pretty heavy stones upon them so as to sink the hemp under water, where it must lie till it be rotted enough.

"What hemp is intended for seed, should be sowed on a piece of ground for itself, which must be made very rich and strong; it must be sowed in ridges six feet wide, and the seed must be of the largest and best sort and sown very thin, at the rate of a peck upon an acre, or rather six quarts; for the thinner it is sown, the more it branches, and the more seed it bears; it should be sown sometime the middle of April, and then the seed will not be ripe till some time after the other hemp is done with. If you have no convenient place to sow your seed hemp by itself, then sow a border of six feet wide along the north and west sides of your hemp field; the reason of sowing your seed hemp in such

narrow ridges or borders, is that, when the carle or he hemp is ripe, and has shed its farina on the fimble or female hemp, by which the seed is impregnated, and the leaves of the carle hemp fall off and the stem grows yellow, you may easily step in along the sides, and pull up the carle hemp without hurting the female, which now begins to branch out, and looks of a deep green colour and very flourishing, and when the seeds begin to ripen, which is known by their falling out of their sockets, you may all along both sides bend down the plants and sh ke out the seed upon a cloth laid on the ground, for as they ripen they scatter upon being shaken by a hard wind, or otherwise; then it must be watched, and the fowls and yellow birds kept from it, for they are immoderately fond of the seed; as the first ripe seeds are the fullest and best, they are worthy of some pains to save them; and the best way to do that is, to bend down the plants all along, on each side of the border or ridge, as is said above, and shake them over a cloth spread on the ground to receive the seed; if one side of the plant be rooted out of the ground by forcing it down to shake out the seed, there will be no damage, for the seed that remains will ripen notwithstanding; and the plant must thus be shaken every two or three days, 'till all the seed be ripe and thus saved; and this is much better than pulling up the plants by the roots, and shaking them on a barn floor, and then setting them up against a fence, or the side of the barn, for the seed to ripen, and shaking them morning and evening on the barn floor; for by this method, which is

the common practice, one third of the seed at least never comes to maturity.

"It is well known to every farmer, that in the three bread colonies at least, the spring and summer seasons are of late years become very dry; so that a crop of flax is become very precarious, scarcely one year in seven producing a good one: This is a constant complaint in the mouth of every husbandman: Now hemp does not require half the rain that flax does; this is a circumstance that is well worth the notice and attention of every farmer; and therefore, by his raising hemp in the manner before directed, and by preparing it in the best manner for spinning and weaving into good cloth, he can, with greater certainty, supply all the necessary uses of his family; and by selling the overplus he can purchase such things as his wife and daughters may think convenient on extraordinary occasions. This however need not hinder him from raising some flax every year: But I think that it is more for his interest to fix his chief dependence upon his crop of hemp, as that is more sure, and every way more profitable, the general run of seasons considered. And let him not be disgusted, and think that I am about to persuade him, his wife and daughters to wear oznabrigs, for I can assure him that I have seen dowlass, which is made of hemp, worth five and six shillings the yard, which no farmer need be ashamed to wear.

"I SHALL now endeavor to instruct the honest husbandman in a few easy rules, for preparing his hemp, which he has raised and managed in the manner before directed.

"KNOW then, that the best preparation of hemp for the manufacturing of cloth, is to render it as soft and as fine as possible, without lessening its strength, and the easiest and cheapest way of doing that, is certainly the best. This is to be found out by a variety of trials and experiments; but till a better way be discovered, which I hope will not be long first, and with which I should be greatly pleased, take the following method, which is the best I have yet been able to discover.

"IF you have a large wide kettle, that will take in your hemp at full length, it will be the better; but if your kettle be small, then you must double your hemp, but without twisting, only the small ends of every hand must be twisted a little, to keep them whole and from tangling; then first of all lay some smooth sticks down in the bottom of the kettle, so as to lie across one another, three or four layers, according to the bigness and deepness of your kettle; this is to keep the hemp from touching the liquor; then pour some lie of middling strength, half as strong as what you make soap of, gently into the kettle, so much as not to rise up to the top of the sticks, they being kept down to the bottom; then lay in the hemp, each layer crossing the other, so that the steem may rise up through

the whole body of the hemp, which done, cover your kettle as close as you can, and hang it over a very gentle fire, and keep it simmering or stewing, but not boiling, so as to raise a steam for six or eight hours; then take it off, and let it stand covered till it be cool enough to handle; then take out the hemp, and wring it very carefully as dry as you well can, and hang it up out of the way of the wind, either in your garret or in your barn, shutting the doors, and there let it remain, turning it now and then till it be perfectly dry; then pack it up in some close dry place, till you want to use it; but you will do well to visit it now and then, lest any part of it might be damp and rot. You must know that wind and air weaken and rot hemp, flax and thread very much. Then, at your leisure, twist up some of the hands, as many as you intend for present use as hard as you can, and with a smart round smooth hand-beetle, on a smooth stone, beat and pound each hand by itself all over very well, turning it round from side to side, till every part be very well bruised; you then untwist it, and hatchel it, first through a coarse, and then through a fine hatchel: And remember, that hatcheling must be performed in the same manner as a man would comb a fine head of hair, he begins at the ends below, and as that untangles he rises higher, till at last he reaches up to the crown of his head. The first tow makes good ropes for the use of the plantation, the second tow will make very good oznabrigs or coarse sheeting; and the hemp itself will make excellent linen. The same method of steaming softens flax very much."

A FLOATING BATTERY,

ON A NEW CONSTRUCTION,

By the late ABRAHAM BLOODGOOD.

THE model of this battery was exhibited to the society, with a verbal description only. The annexed plate shews an exact profile view of its body, the shape of which, as seen from above, is circular. It is to be connected at the centre of its bottom with a strong keel, in such a manner that while the keel is held by cables and anchors in one position, the battery is made to turn round on its centre. This motion may be given to it, either by the tide acting on float-boards, attached to the body of the battery; by sails raised on its exterior parts, or by manual application. In this last way it may be effected by men in the hold, drawing on a lever fastened to a post fixed to the keel, and rising through a well-hole in the centre of the battery. The strength of horses might perhaps be applied to the same purpose. The cables, by which the keel is held, are to be entirely under water, and thus secure from an enemy's shot.

THE advantages of such a battery would be:

1*st*. ITS rotary motion would bring all its cannon to bear successively, as fast as they could be loaded, on objects in any direction.

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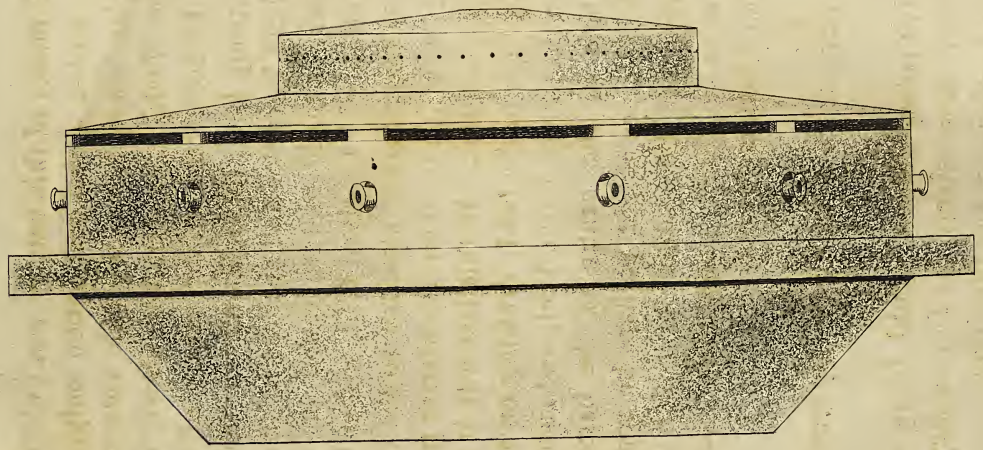

FLOATING BATTERY *Invented By* Alm. Bloodwood

2*nd*. Its circular form would cause every shot that might strike it, not near the centre, to glance.

3*rd*. Its motion, as well as its want of parts on which graplings might be fastened, would render boarding almost impossible.

4*th*. The steadiness with which it would lay on the water would render its fire more certain than that of a ship.

5*th*. The guns would be more easily worked than is common, as they would not require any lateral movement.

6*th*. The men would be completely sheltered from the fire of the elevated parts of an enemy's ship.

7*th*. The battery might be made so strong as to be impenetrable to cannon shot, &c.

EXTRACT FROM THE MINUTES OF THE SOCIETY.

February 11*th*, 1807.

WHEREAS five different specimens of woollen cloth of a superior quality, manufactured in the family of Mr. WALTER BRIGGS, of the county of Schoharie, in this state, have been laid before this society: And whereas it is represented, that the said cloths were made from the wool produced from his flock, consisting of about 300 sheep, and that about 1200 yards of different kinds of cloth are annually manufactured by the daughters of the said Walter Briggs, in his family. Therefore, for the encouragement of this important and useful branch of domestic manufactures,

Resolved, That a piece of silver plate be presented to the said Walter Briggs, as a testimony of the commendation of this society for his laudable attention to the raising of sheep, and for the industry of himself and daughters in the manufacturing of cloth; and that a committee be appointed to direct the making of the said plate, to devise a suitable inscription for the same, and to present it, in the name of this society, to the said Walter Briggs.

AN ACT

TO INCORPORATE A SOCIETY FOR THE PROMOTION OF USEFUL ARTS.

Passed April 2nd, 1804.

WHEREAS the institution of a society, calculated to promote, collect and preserve the knowledge of useful arts, is intimately connected with the public welfare and prosperity : Therefore,

Be it enacted by the people of the state of New-York, represented in senate and assembly, That all such persons who shall, at the time of the passing of this act, be members of the society for the promotion of agriculture, arts and manufactures, and such other persons who shall from time to time become members of the society hereby intended to be incorporated, and shall within ten months after the passing of this act, signify their intention in writing, subscribed by them respectively, to Samuel L. Mitchell or Benjamin De Witt, the present secretaries of the said society, to become members of the society hereby intended to be incorporated, and shall pay to either of them two dollars for the use of the said society, shall be, and hereby are, constituted a body corporate and politic by the name of " the Society for the promotion of Useful Arts ;" that by that name the said society shall have perpetual succession ; and that the said society and their successors shall be capable in law to sue and be sued, plead and be impleaded, answer

and be answered, defend and be defended, in all courts and in all actions, suits, matters and causes whatsoever, and to purchase, take, receive, hold and enjoy, any real or personal estate, in fee simple or otherwise, and the same to lease, sell, dispose of and convey, for the purpose of the better enabling them to carry into effect such measures as to the said society shall seem best calculated to promote agriculture, arts and manufactures within this state : *Provided*, That the clear annual value of such real and personal estate shall not exceed the sum of two thousand five hundred dollars : That the said society shall have a common seal, which may from time to time be changed or altered at its pleasure.

And be it further enacted, That the said society shall, from time to time, forever hereafter, have power to make, constitute, ordain and establish such by-laws and regulations as they shall judge proper for the election of their officers, for prescribing their respective functions, and the mode of discharging the same ; for the admission of new members into the said society ; for the government of the officers and members thereof ; for ascertaining an equal annual rate of contributions towards the funds thereof ; for regulating the times and places of meeting for managing the affairs of the said society, and for suspending or expelling such members of the said society, as shall neglect or refuse to comply with the by-laws and regula-

tions thereof, so as such by-laws and regulations shall not be repugnant to the laws of the United States or of this state.

And be it further enacted, That a president and one or more vice-presidents, nine counsellors, two or more secretaries, a treasurer, and such other officers as the said society shall, by any by-law, from time to time appoint, shall be elected by a plurality of votes of the members of the said society present at any election: That such election shall be annually held in the senate chamber, or at such other place as the said society shall from time to time by by-law direct and appoint, on the Tuesday next succeeding the day on which both houses of the legislature shall have been formed, ready to proceed to business, after the first day of January in every year: That the said officers shall respectively hold their offices until the next annual election day, or until others shall be elected in their stead: That if the annual election shall not be held at any of the days for that purpose appointed, it shall be lawful to make such election at any other day; and that the president, or one of the vice-presidents, with any twelve or more of the said society, meeting at the place designated for that purpose by any by-law, shall constitute a legal meeting of the said society.

And be it further enacted, That the books, papers, monies and effects of the society for the promotion of agriculture, arts and manufactures, shall be and

the same are hereby with the approbation, and at the instance of the last mentioned corporation, vested in the said society for the promotion of useful arts, from and after the fourth day of May next, on which day the corporation aforesaid expires by its own limitation.

And be it further enacted, That the members of the legislature shall in that capacity be honorary members of the said society; but shall not vote at elections, or have any voice in the disposition of the funds of the said society.

And be it further enacted, That Robert R. Livingston shall be the president, and Ezra L'Hommedieu the vice-president of the said society, until the second annual election day.

2*nd*. Its circular form would cause every shot that might strike it, not near the centre, to glance.

3*rd*. Its motion, as well as its want of parts on which graplings might be fastened, would render boarding almost impossible.

4*th*. The steadiness with which it would lay on the water would render its fire more certain than that of a ship.

5*th*. The guns would be more easily worked than is common, as they would not require any lateral movement.

6*th*. The men would be completely sheltered from the fire of the elevated parts of an enemy's ship.

7*th*. The battery might be made so strong as to be impenetrable to cannon shot, &c.

EXTRACT FROM THE MINUTES OF THE SOCIETY.

February 11*th*, 1807.

WHEREAS five different specimens of woollen cloth of a superior quality, manufactured in the family of Mr. WALTER BRIGGS, of the county of Schoharie, in this state, have been laid before this society: And whereas it is represented, that the said cloths were made from the wool produced from his flock, consisting of about 300 sheep, and that about 1200 yards of different kinds of cloth are annually manufactured by the daughters of the said Walter Briggs, in his family. Therefore, for the encouragement of this important and useful branch of domestic manufactures,

Resolved, That a piece of silver plate be presented to the said Walter Briggs, as a testimony of the commendation of this society for his laudable attention to the raising of sheep, and for the industry of himself and daughters in the manufacturing of cloth; and that a committee be appointed to direct the making of the said plate, to devise a suitable inscription for the same, and to present it, in the name of this society, to the said Walter Briggs.

AN ACT

TO INCORPORATE A SOCIETY FOR THE PROMOTION OF USEFUL ARTS.

Passed April 2nd, 1804.

WHEREAS the institution of a society, calculated to promote, collect and preserve the knowledge of useful arts, is intimately connected with the public welfare and prosperity : Therefore,

Be it enacted by the people of the state of New-York, represented in senate and assembly, That all such persons who shall, at the time of the passing of this act, be members of the society for the promotion of agriculture, arts and manufactures, and such other persons who shall from time to time become members of the society hereby intended to be incorporated, and shall within ten months after the passing of this act, signify their intention in writing, subscribed by them respectively, to Samuel L. Mitchell or Benjamin De Witt, the present secretaries of the said society, to become members of the society hereby intended to be incorporated, and shall pay to either of them two dollars for the use of the said society, shall be, and hereby are, constituted a body corporate and politic by the name of " the Society for the promotion of Useful Arts ;" that by that name the said society shall have perpetual succession ; and that the said society and their successors shall be capable in law to sue and be sued, plead and be impleaded, answer

and be answered, defend and be defended, in all courts and in all actions, suits, matters and causes whatsoever, and to purchase, take, receive, hold and enjoy, any real or personal estate, in fee simple or otherwise, and the same to lease, sell, dispose of and convey, for the purpose of the better enabling them to carry into effect such measures as to the said society shall seem best calculated to promote agriculture, arts and manufactures within this state : *Provided*, That the clear annual value of such real and personal estate shall not exceed the sum of two thousand five hundred dollars : That the said society shall have a common seal, which may from time to time be changed or altered at its pleasure.

And be it further enacted, That the said society shall, from time to time, forever hereafter, have power to make, constitute, ordain and establish such by-laws and regulations as they shall judge proper for the election of their officers, for prescribing their respective functions, and the mode of discharging the same ; for the admission of new members into the said society ; for the government of the officers and members thereof ; for ascertaining an equal annual rate of contributions towards the funds thereof ; for regulating the times and places of meeting for managing the affairs of the said society, and for suspending or expelling such members of the said society, as shall neglect or refuse to comply with the by-laws and regula-

tions thereof, so as such by-laws and regulations shall not be repugnant to the laws of the United States or of this state.

And be it further enacted, That a president and one or more vice-presidents, nine counsellors, two or more secretaries, a treasurer, and such other officers as the said society shall, by any by-law, from time to time appoint, shall be elected by a plurality of votes of the members of the said society present at any election: That such election shall be annually held in the senate chamber, or at such other place as the said society shall from time to time by by-law direct and appoint, on the Tuesday next succeeding the day on which both houses of the legislature shall have been formed, ready to proceed to business, after the first day of January in every year: That the said officers shall respectively hold their offices until the next annual election day, or until others shall be elected in their stead: That if the annual election shall not be held at any of the days for that purpose appointed, it shall be lawful to make such election at any other day; and that the president, or one of the vice-presidents, with any twelve or more of the said society, meeting at the place designated for that purpose by any by-law, shall constitute a legal meeting of the said society.

And be it further enacted, That the books, papers, monies and effects of the society for the promotion of agriculture, arts and manufactures, shall be and

the same are hereby with the approbation, and at the instance of the last mentioned corporation, vested in the said society for the promotion of useful arts, from and after the fourth day of May next, on which day the corporation aforesaid expires by its own limitation.

And be it further enacted, That the members of the legislature shall in that capacity be honorary members of the said society; but shall not vote at elections, or have any voice in the disposition of the funds of the said society.

And be it further enacted, That Robert R. Livingston shall be the president, and Ezra L'Hommedieu the vice-president of the said society, until the second annual election day.

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